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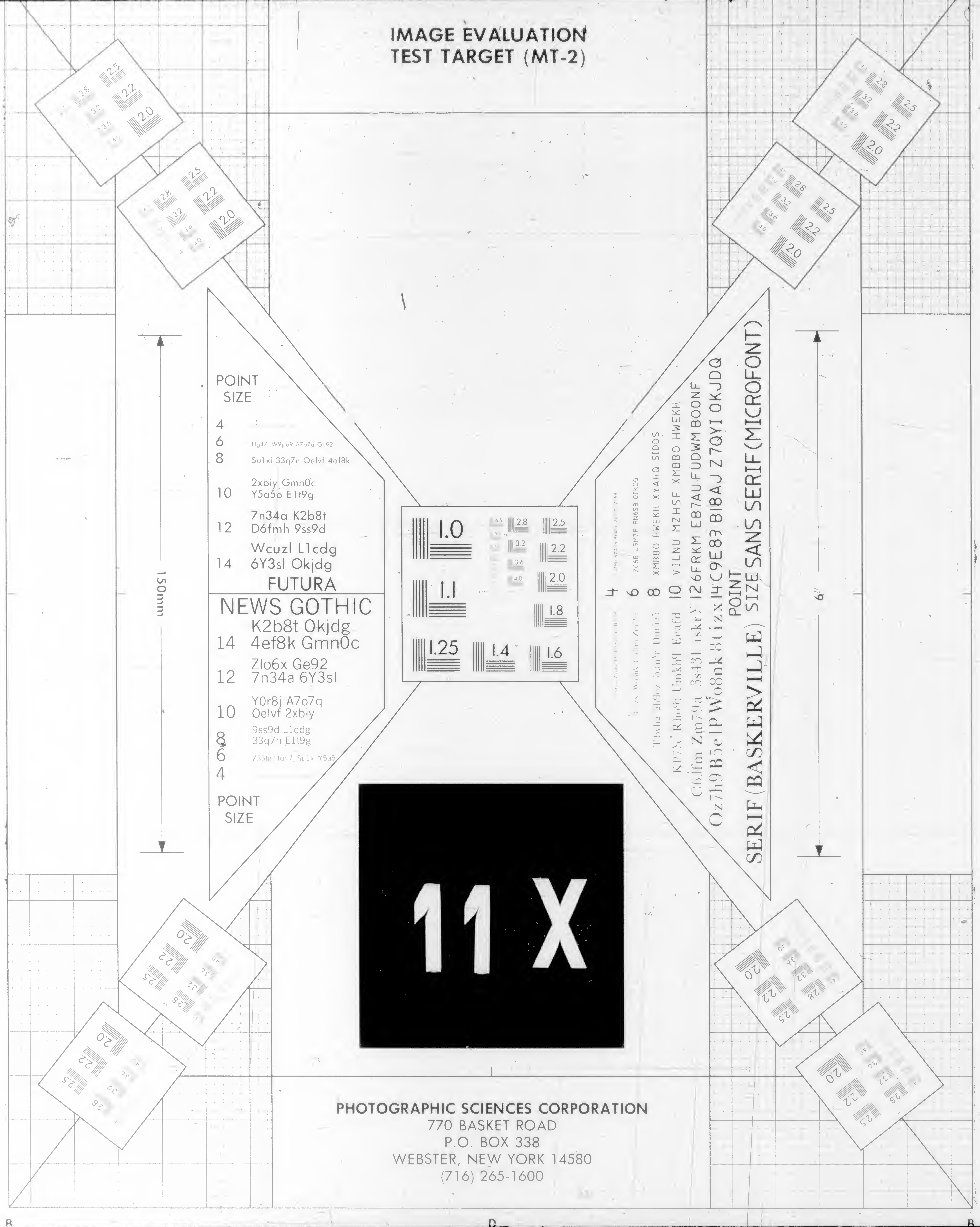

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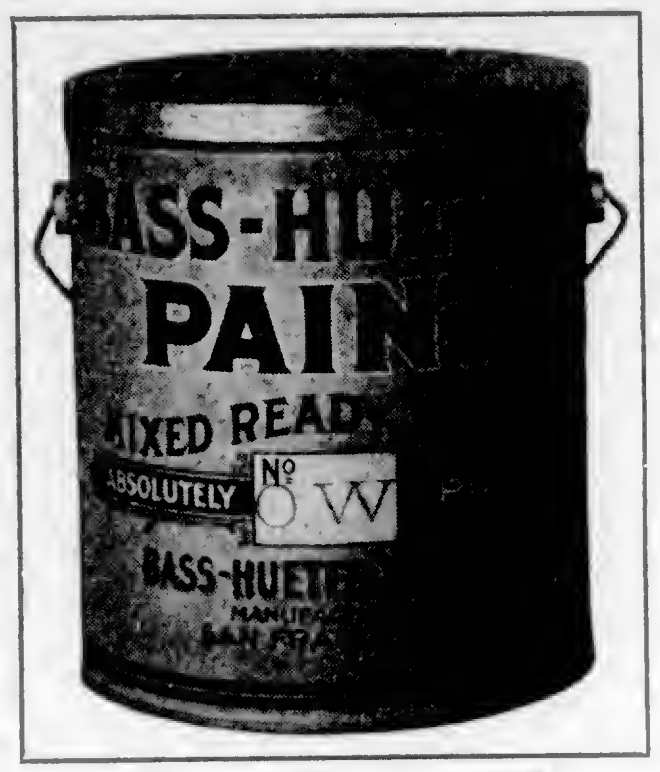

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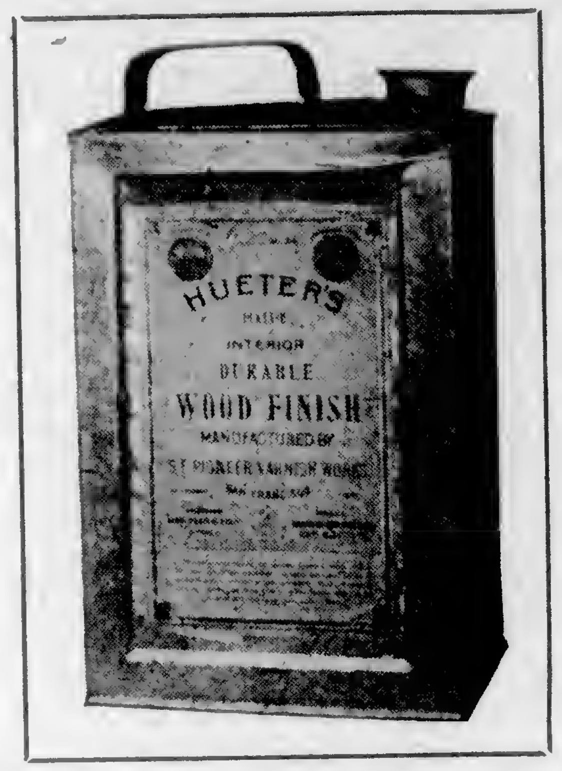

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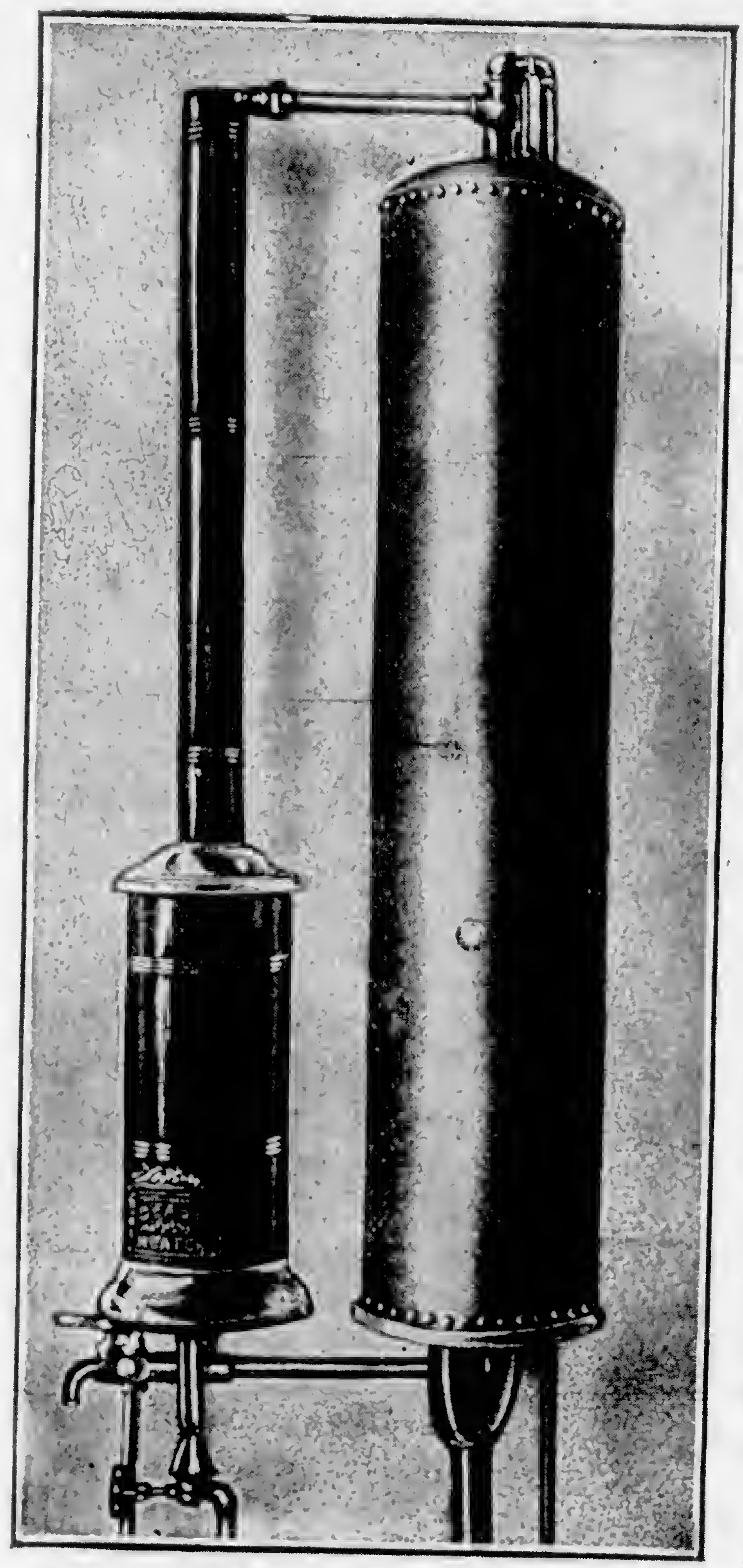

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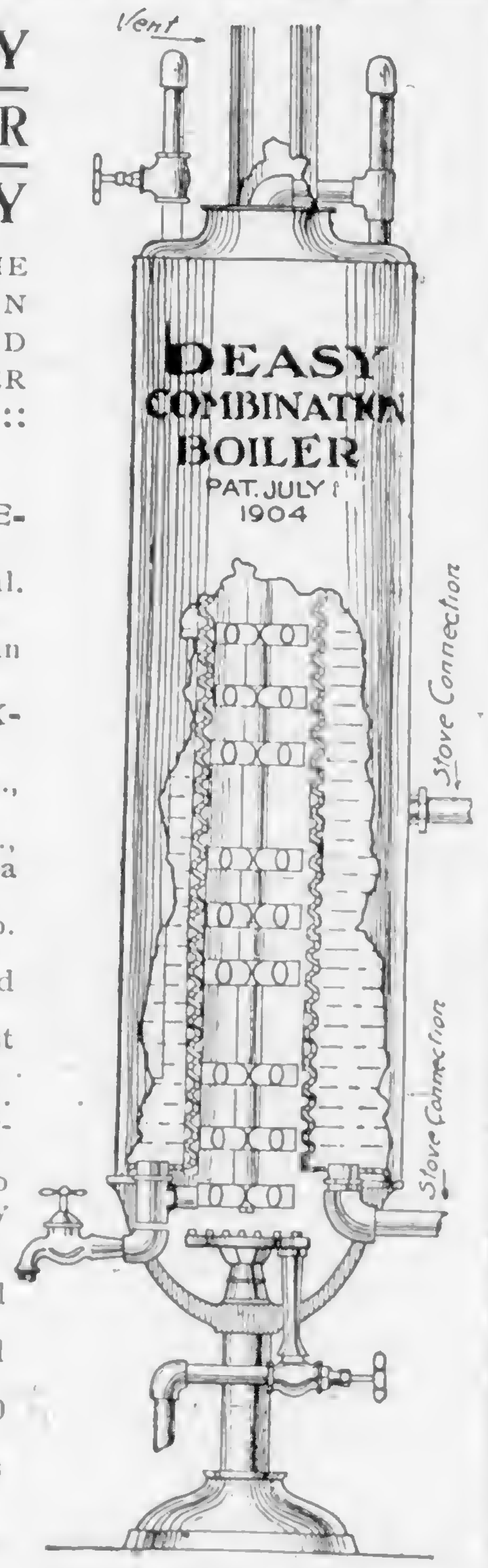

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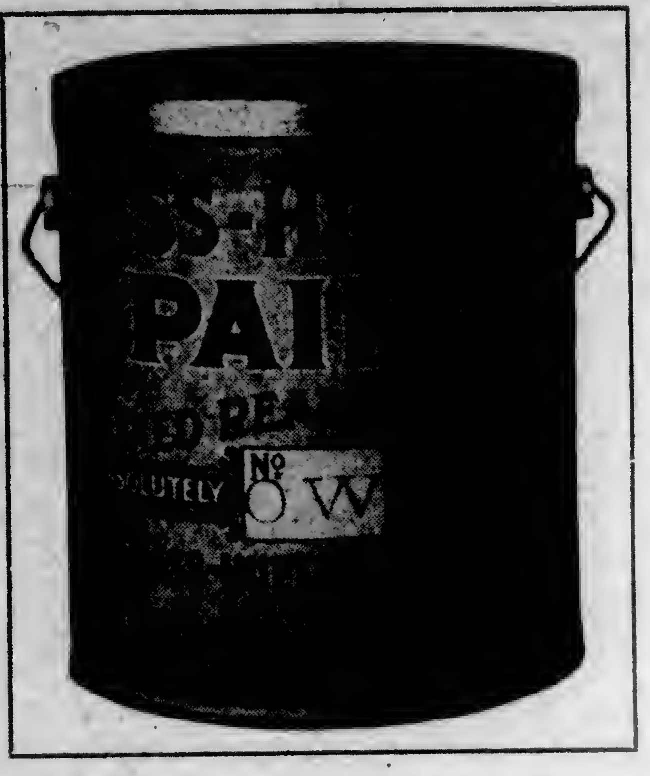

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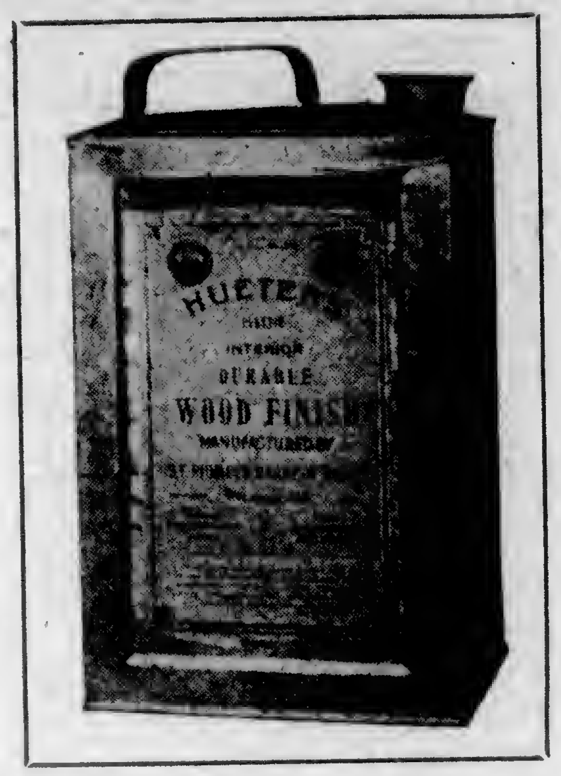

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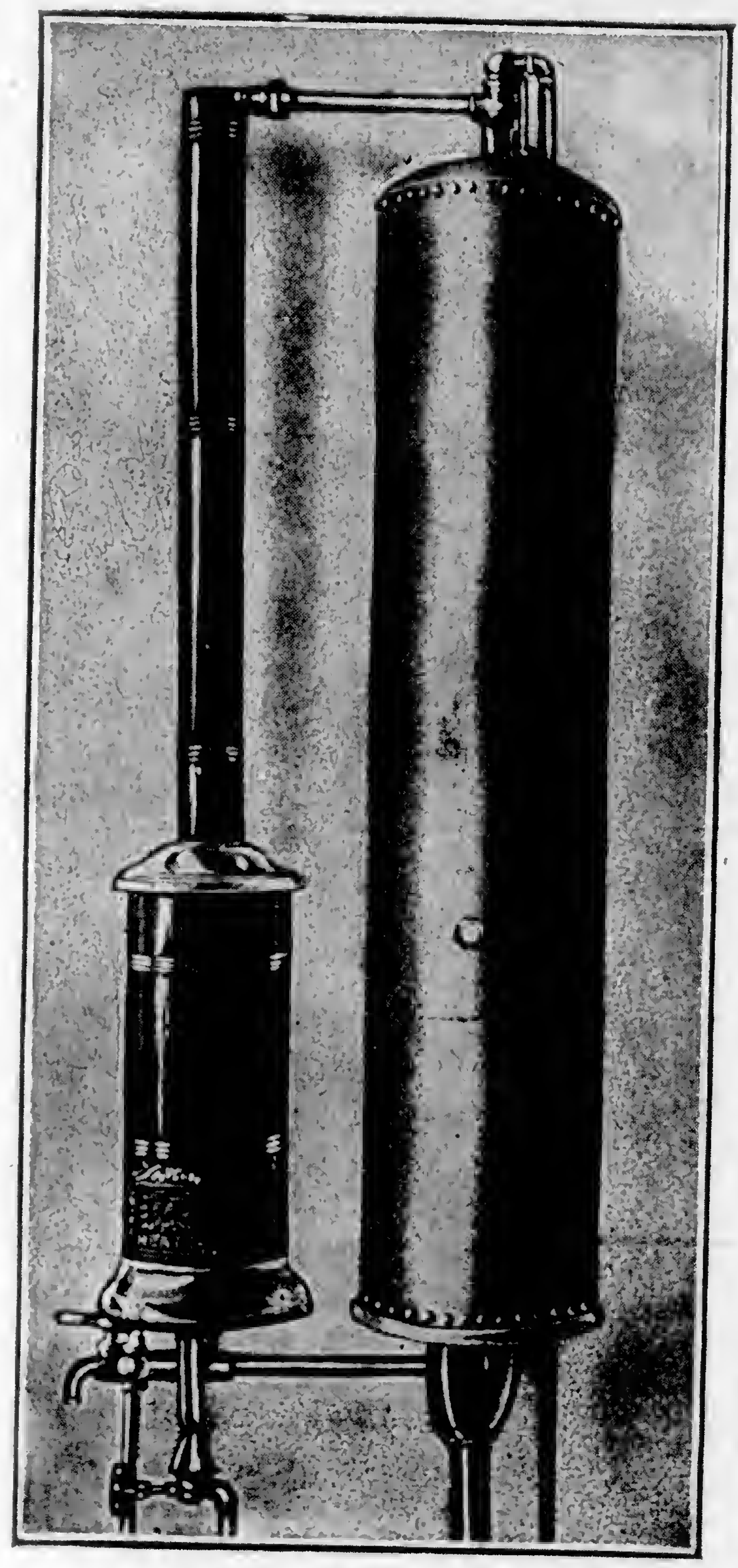

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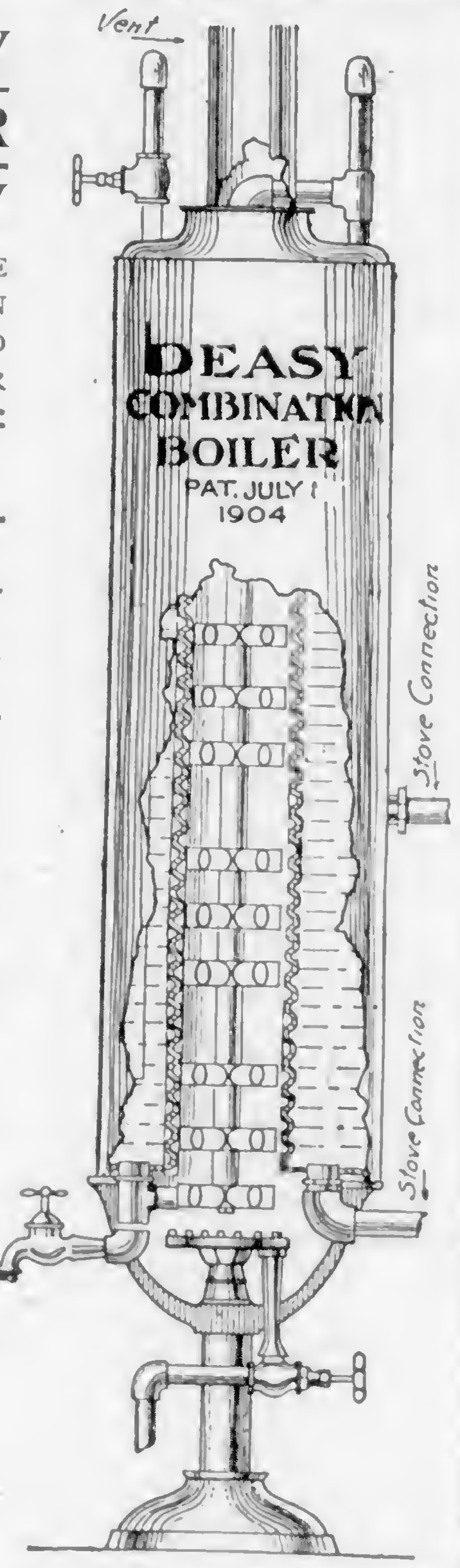

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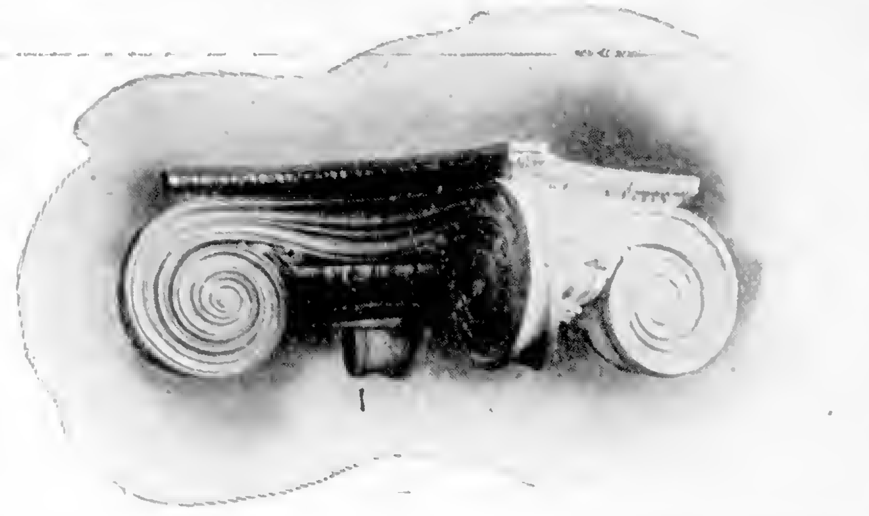

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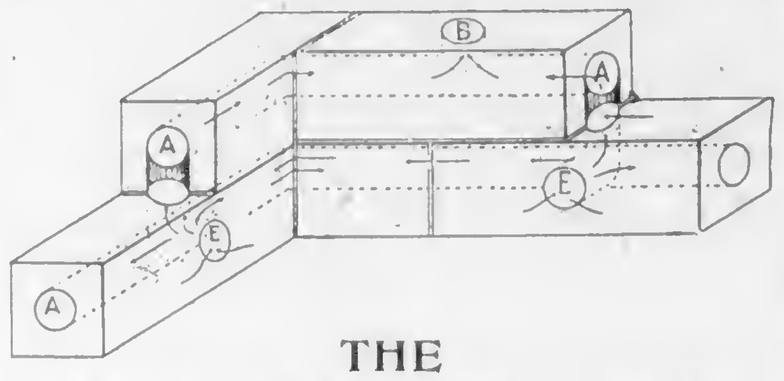

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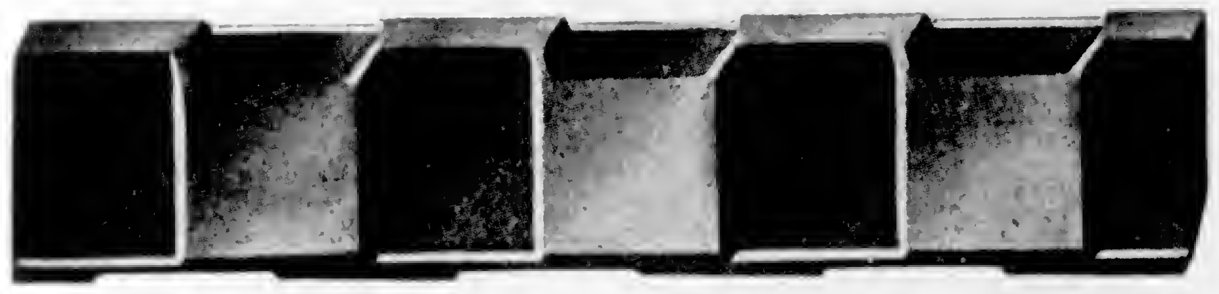

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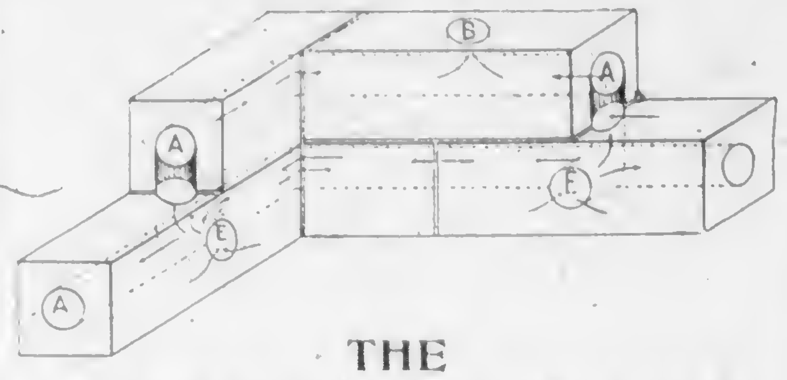

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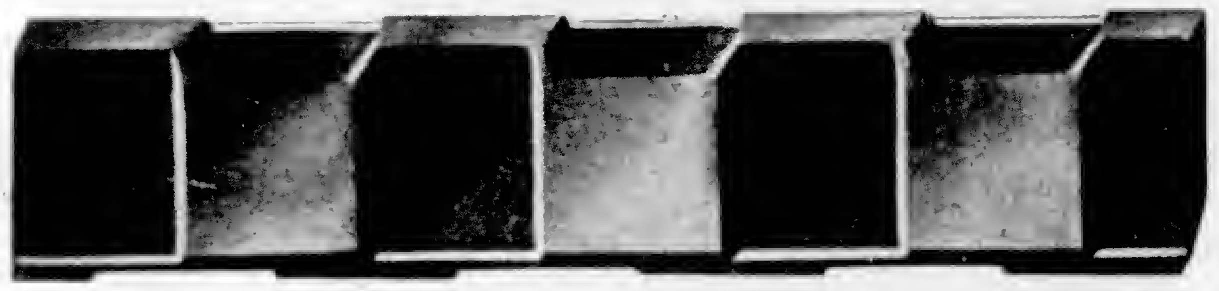

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Sand finish—One part Empire hard wall plaster, two parts clean sharp sand.

Wood lath, two-coat work—One part Empire hard wall plaster fibred, two parts clean sharp sand (fresh-water sand preferable), mixed thoroughly and applied within two hours after mixing.

White coat and sand finish same as for metal lath.

Finishing coat should be applied within 48 hours after first coat is put on.

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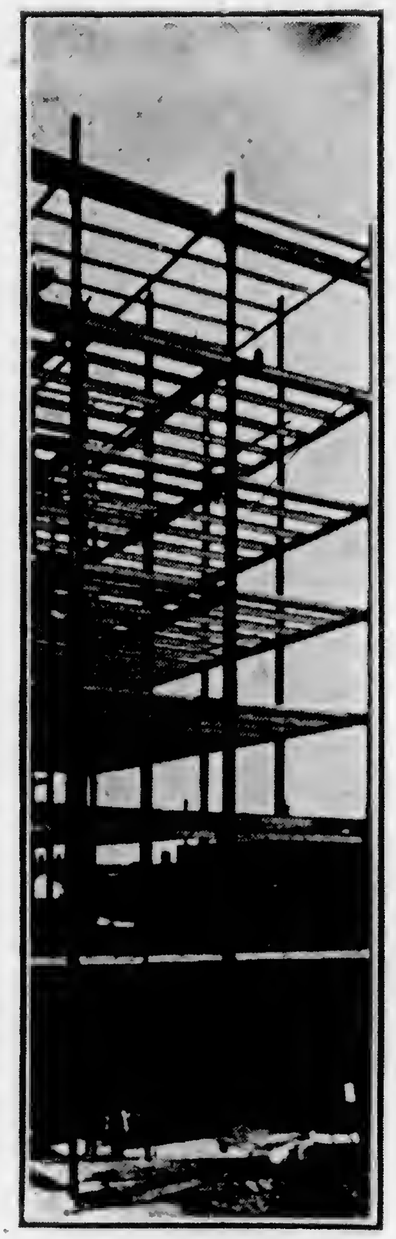

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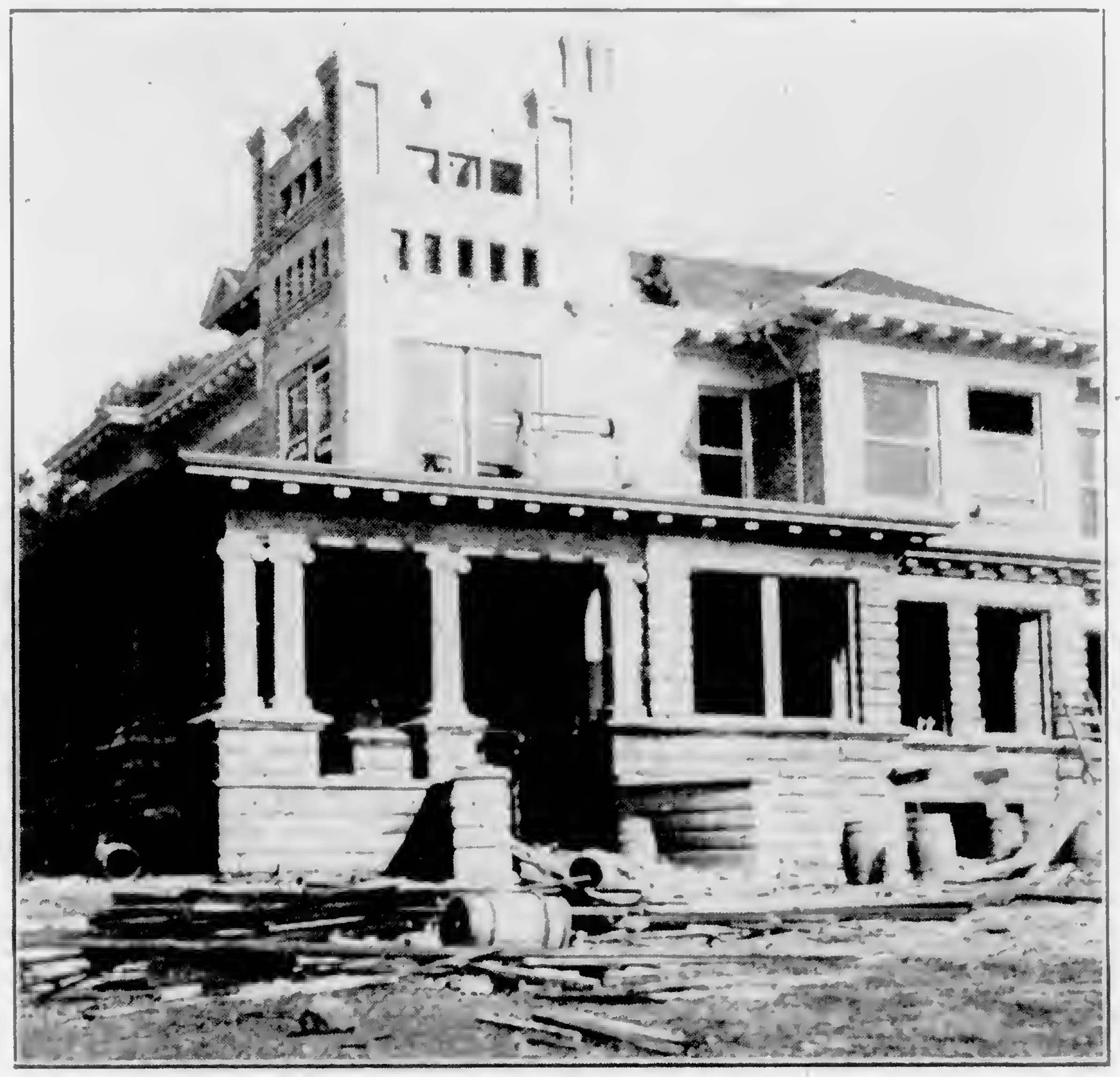

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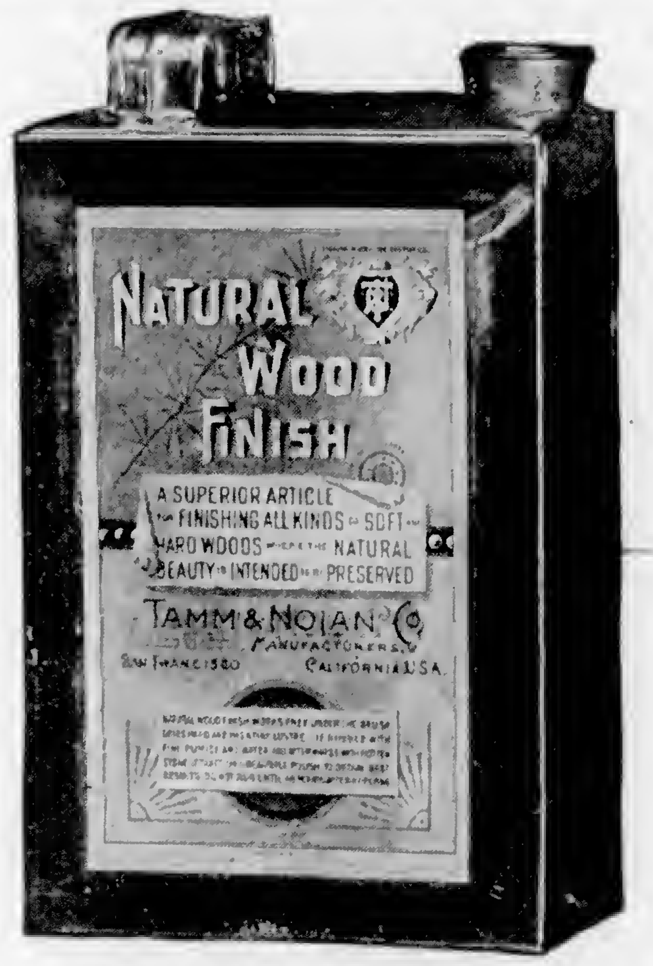
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Contents for February

Frontispiece—*John Parkinson, Architect*
The Dream of the City—*Arthur O. Johnson* - - - - - - - - - 19
A Clever Country Club House—*William Knowles, Architect* - - - - 25
The House of Senator Clark—An Architectural Aberration - - - - - 29

CEMENT AND CONCRETE—

Various Uses of Cement—*Richard L. Humphrey* - - - - - - 35
The Causes and Failure in the Concrete Block Business—*O. U. Miracle* - 39
Reinforced Concrete Tests at the University of California—*Charles Derleth, Jr., C. E.* - - - - - - - - - - - - - 49
Cement and Building Construction—*C. A. P. Turner, M. Am. Soc. C. E.* - 51
Cement Block Architecture—*Louis H. Gibson, Architect* - - - - 55
Reinforcement in Pollasky Bridge - - - - - - - - - - 60
The National Cement Users Convention, *Wm. B. Gester, C. E.* - - - 61

BRICK AND TERRA COTTA—

Bricks Have Made History—*W. E. Dennison* - - - - - - - 69
Fireproof Theatres—*W. I. Parry* - - - - - - - - - 69

THE CITY BEAUTIFUL—

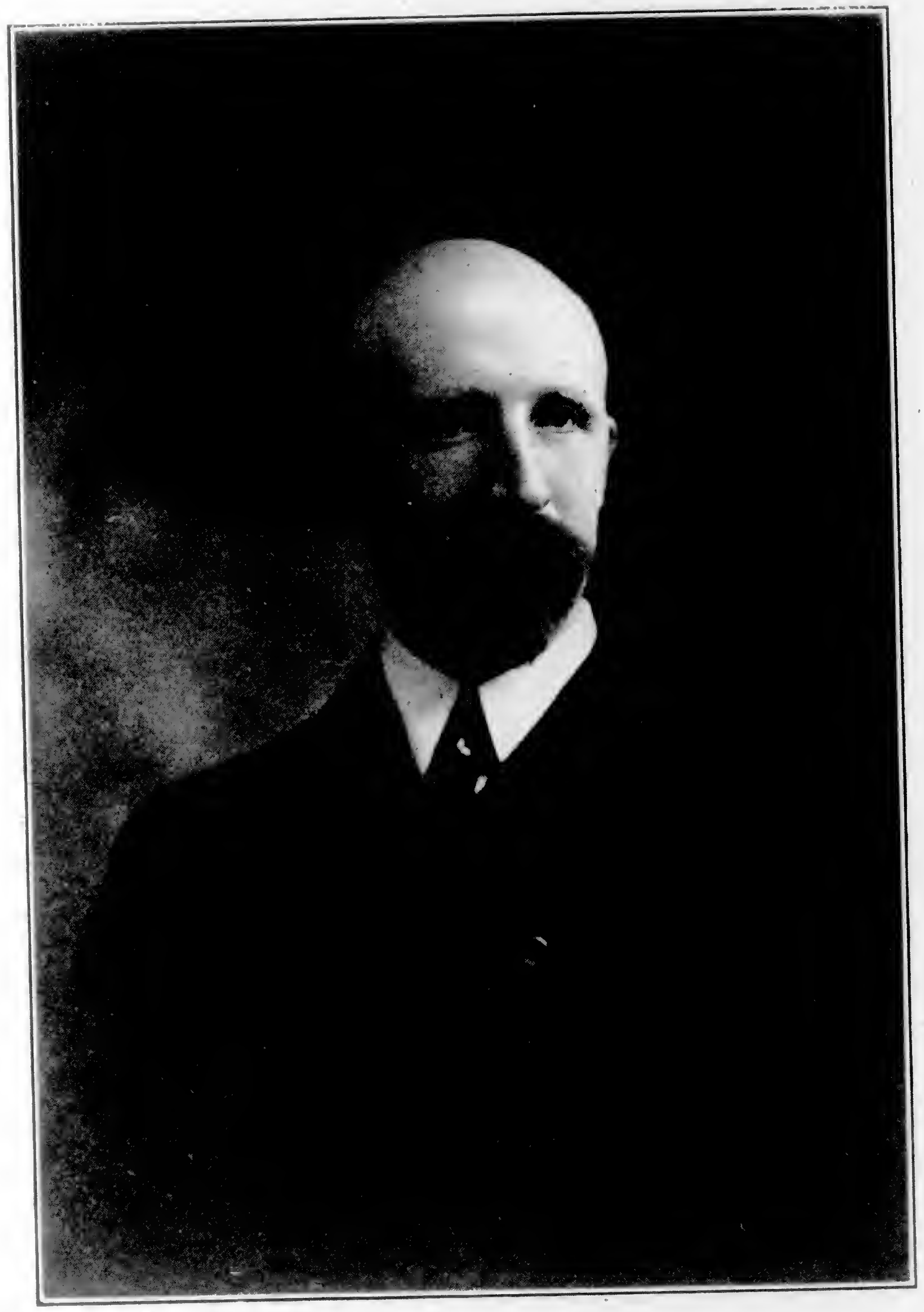
The San Francisco of the Future—*Herbert E. Law* - - - - - 73
Painting—*Houston Lowe* - - - - - - - - - - - - - 79
The Architectural League of America - - - - - - - - - 81

INTERIOR DECORATION—

New Art in Decorative Work—*C. Walter Tozer* - - - - - - 83
AMONG THE ARCHITECTS - - - - - - - - - - - - - 89

EDITORIAL—

Reinforced Concrete on the Pacific Coast - - - - - - - - 92
Houses for the Working Class - - - - - - - - - - - 93
The Architectural League of America - - - - - - - - - 93
THE PUBLISHER'S CORNER - - - - - - - - - - - - - 94



Mr. John Parkinson, Architect C-347

The Architect and Engineer
Of California

VOL. IV FEBRUARY, 1906. NO. 1

The Dream of the City

Being a Fable for the Property Owners of San Francisco

By ARTHUR O. JOHNSON

SAN FRANCISCO has been sleeping a long time, but now she is awake. While sleeping she dreamed that she was California's favored child, for her home had a Golden Gate, and in her garden, smiled on by sunny skies the year round, grew the most beautiful flowers in the world. Her garden's edge was washed by a grand ocean that spread its waters as far as the eye could reach into the Western distance. When wild winds tossed the seas, the hills of her vast estate sheltered the harbor wherein her boys' ships lay at anchor, discharging the large cargoes of Oriental goods that she would sell to her less fortunate sisters.

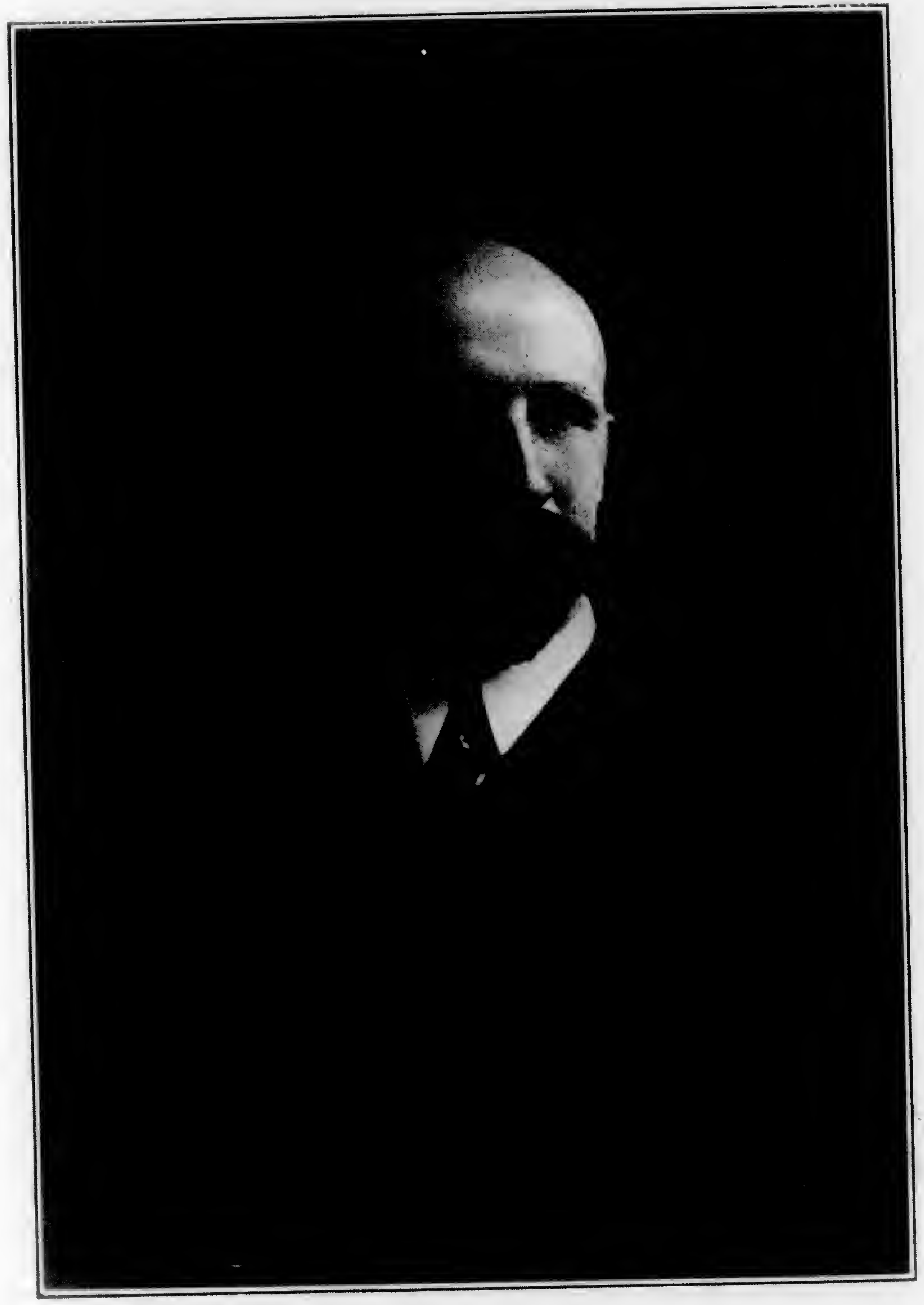
Her wealth had grown to such an enormous size that she became lazy and exorbitant, so much so that the plain Seattle girl, taking a mean advantage, taught her boys to build ships and stole a good bit of the world's commerce from her.

Then that beautiful Los Angeles woman, by cultivating her gardens had made them world famous, and by spending all her money on ornaments had made herself so attractive that people liked her and came from all over the world to buy portions of her estate and erect houses thereon.

Dreaming of her rivals made San Francisco so jealous that she tossed and fretted until she awoke to see standing before her the Goddess of Art, her hand raised as a signal that she wished to speak.

"My child," she began, "not many years ago you were young, uncouth and smacked of the village. Rough men danced and flirted with you; in their homely way they paid you compliments; they were wild adventurers, however, and cared more for your mother's gold than for your looks. What these men wanted was wealth, and their greed for it made them forget to buy you ornaments; consequently you grew up a neglected girl.

"Nature was kind to you in the beginning, giving you a good form and surroundings and sheltering you from the wild and rough storms that other and less fortunate children must endure.



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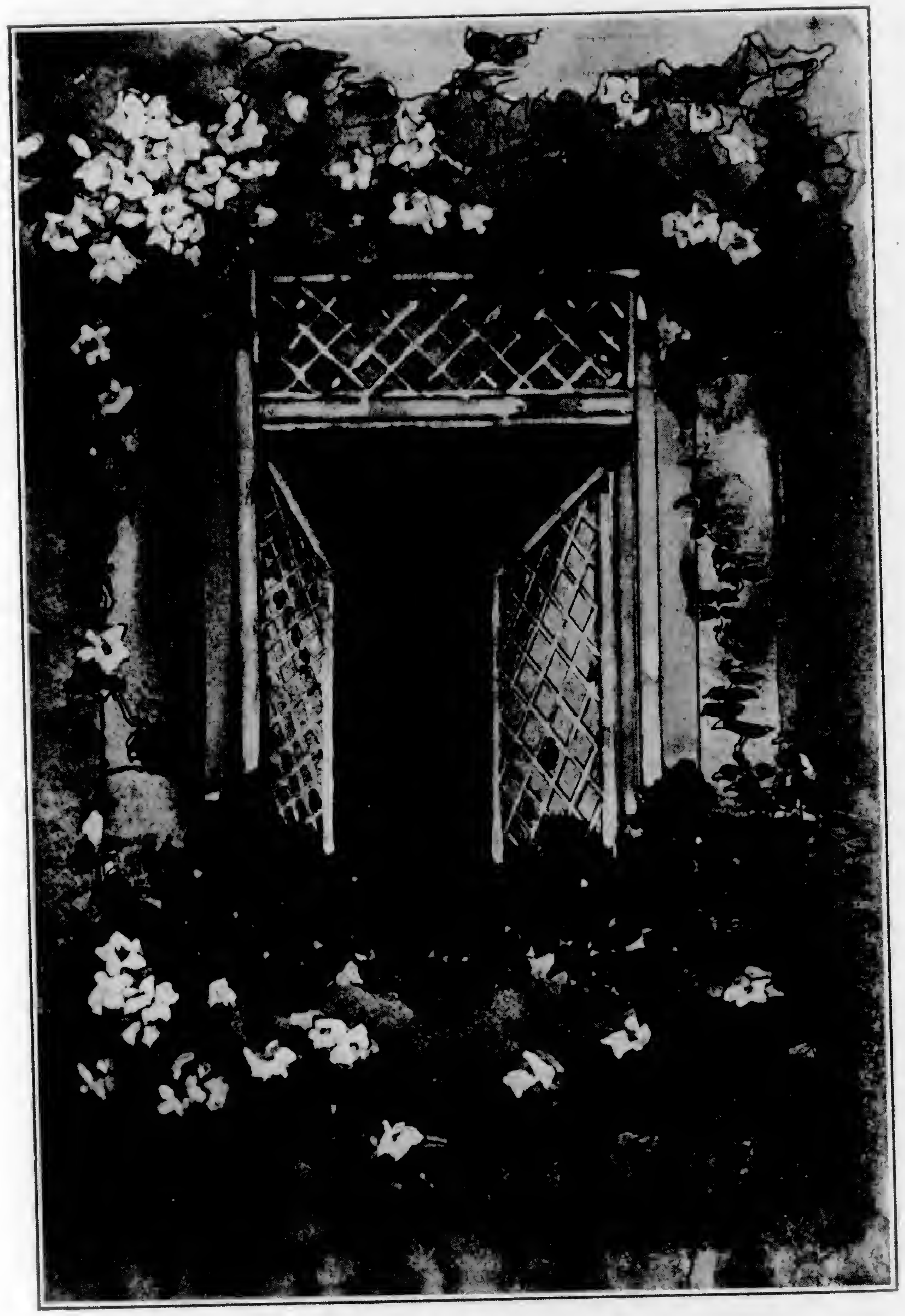
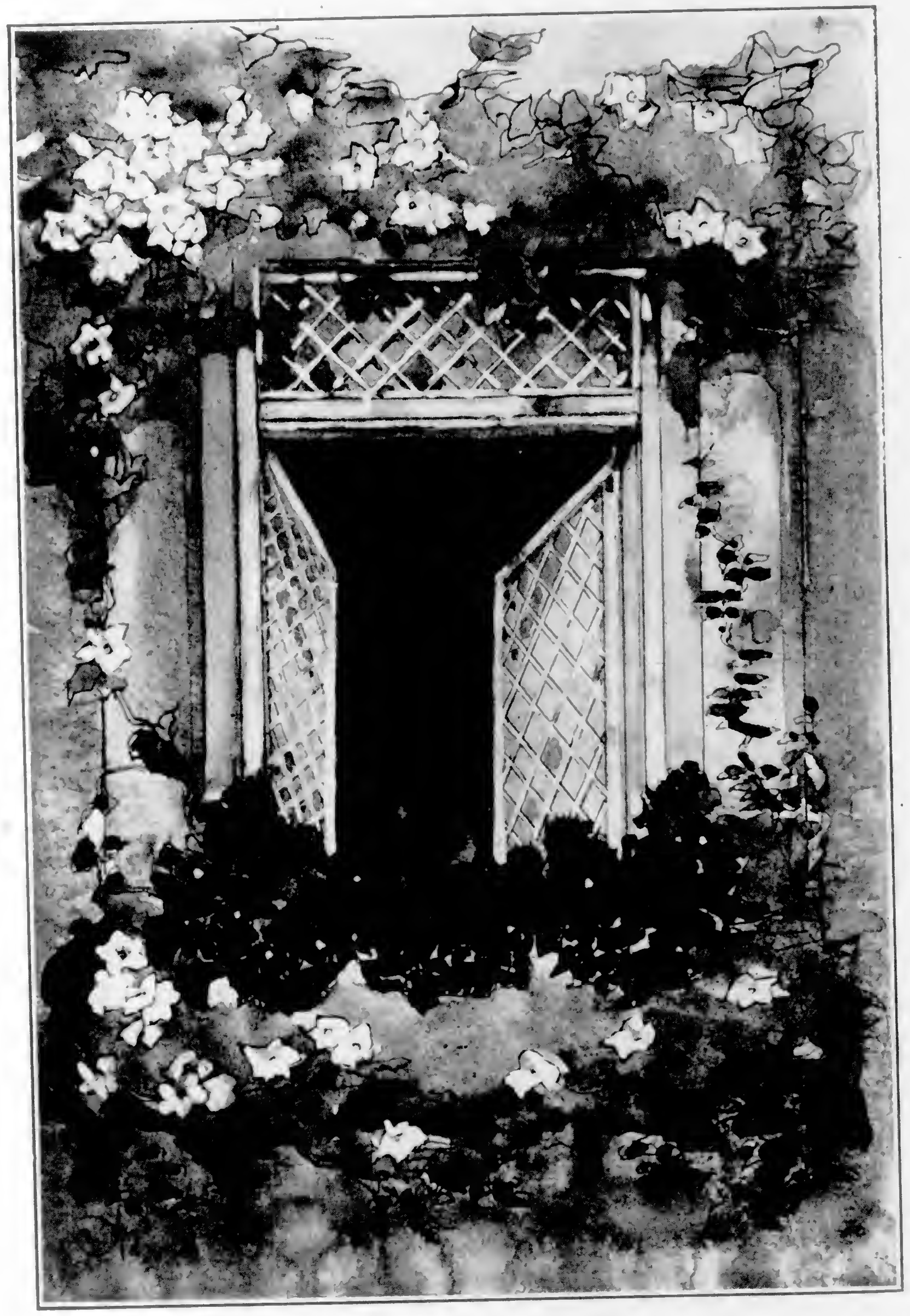


Window-Box Treatment *From Drawing by Edward H. Bennett* C-316

The Window-box should be framed with a vine if possible, the box hidden by foliage.

Floral Treatment of House Front *From Drawing by Edward H. Bennett* C-317

Showing Front Garden, Window-Box and Balcony



Window-Box Treatment *From Drawing by Edward H. Bennett* C-316

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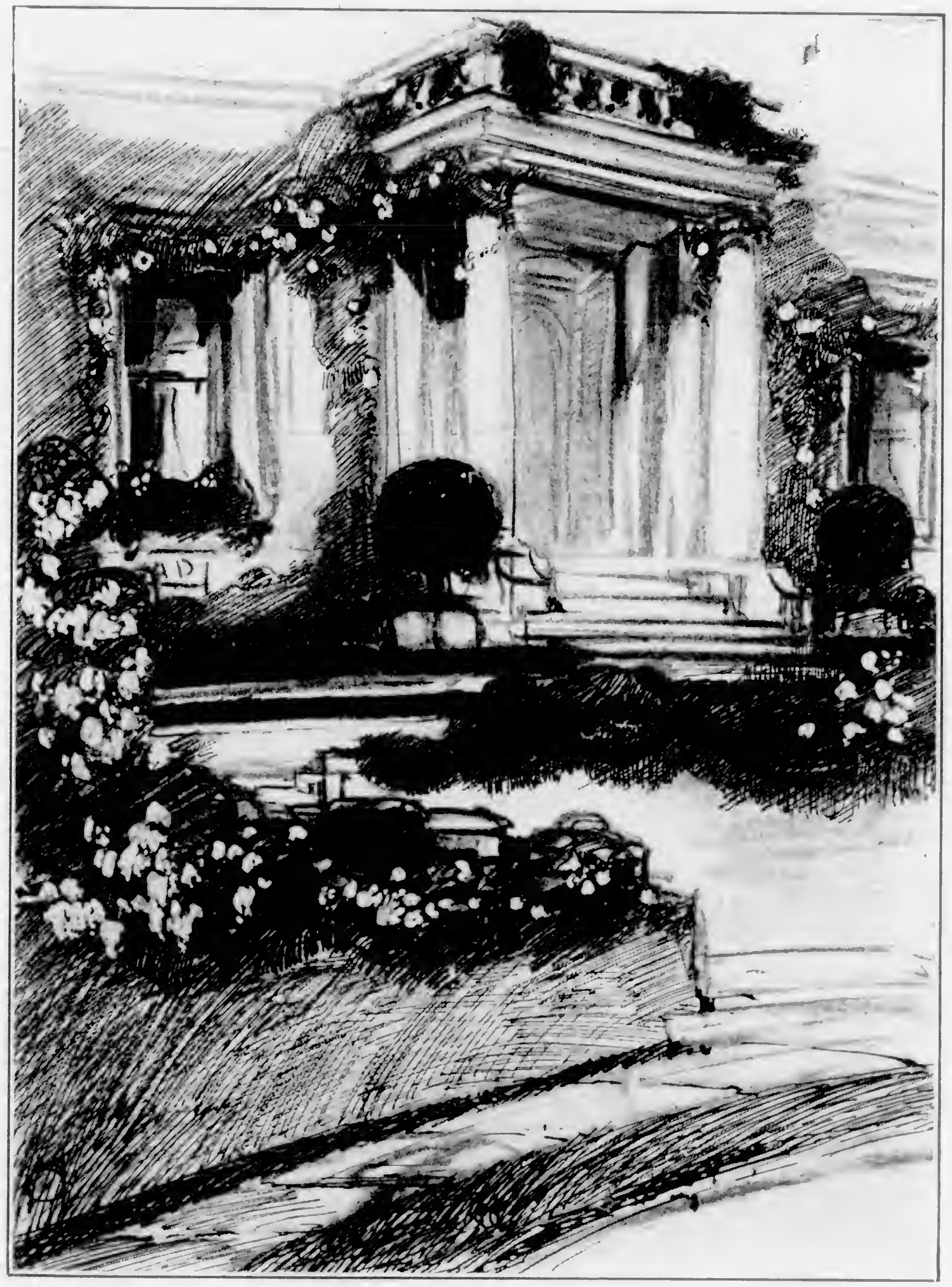


Floral Treatment of House Front *From Drawing by Edward H. Bennett* C-317

Showing Front Garden, Window-Box and Balcony

"When your first children came the rush and whirl of finding work and homes for all of them pushed culture into a dark corner, where it lay forgotten until your grandchildren's need of an education brought it before their parents' eyes. Culture would not budge from its hiding place, however, until you had built schools (rough schools they were at first, too); but they paved the way for the magnificent ones you are now erecting.

"Your reputation is now established throughout the world for the size of your family; but what good is that? Let me tell you, your family has brought you wealth and respect; now make them bring you admiration. Make your children bedeck you with ornaments that will set off your form to its best advantage. These, with the culture and wealth you now have, will bring you the lasting admiration you crave.

"You must attract men to you so that they will buy and settle on your estate; this cannot be accomplished by remaining plain. You probably remember how my sister Pandora used to bedeck herself that she might beguile men to her, only to send them away with ills and troubles. Follow her example, but distribute sunshine and wealth to your admirers."

The Goddess paused in her talk and reached for a chair; as she seated herself she asked: "Have you been doing anything lately toward beautifying yourself?"

"I have a few children who think of me," San Francisco replied, in a reflective tone. "These children have organized into clubs and have agreed to make my improvement their life's work. I am proud of all of them, for the work they have accomplished is wonderful, especially when you think of the obstacles they had to overcome.

"The Merchants' Association is my chief pride, for its members were the first to think of beautifying me. For eleven years now they have toiled in my behalf.

"You, as the Goddess of Art, would probably frown on street cleaning as not being artistic, but I say that to beautify is an art, and surely the cleaning of streets is beautifying them.

"About ten years ago the Merchants' Association established my present street-cleaning system, and followed it with a street-sprinkling system that keeps the dust from flying in my sons' and daughters' eyes on windy days. Then they were the means of having my streets studded with brilliant electric lights. Before these came, dark and lonely places were given a ghastly hue by feeble gas lamps. Darkness breeds vice and vice destroys beauty. So these sons made beauty possible by placing electric lights where they would shed a brilliancy that could only be rivaled by the sun.

"They secured better pavements for my streets, so that man and beast would have an easier walk than the old style cobble stones afforded them.

"They removed the overhead wires from my business district, and the objectionable projecting signs that used to be so conspicuous along the principal thoroughfares.

"Then they built an ornamental safety station at my principal street crossing, where every day, as they rushed for a car, my daughters' lives were being endangered by the numerous passing teams.

"In one of my parks they constructed a convenience station, and made it attractive by planting shrubbery around its entrances. My children have shown their appreciation by duplicating these stations in other portions of the municipality.

"Just at present they are engaged in trying to improve the car system so that transportation to the outlying districts of my large estate will be quickened. This will cause the building of good houses in what is now thinly populated districts and prevent my sons emigrating to surrounding estates not in my possession.

"The Merchants' Association does all within its power to bring homes to my estate; when homes are gained she stops and lets the Adornment Association step in to beautify them.

"The last-named association is an organization of representative sons who are trying to promote the beautifying of the streets, public buildings, parks and squares. They try to create a sentiment of civic pride in my sons, so that they will improve their private property, making the estate a more agreeable place in which to live.

"They have employed an architect of world-wide reputation to draft a plan that will be a guide to my sons in laying out new parks and extending the old ones; to establish new grades and new roads in, around and out of my municipality, so that the hills and suburbs will be easier of access; a plan that would show them how to group future public buildings, and that would make this the most beautiful estate in the world. They have the plan, and to tell you of its success would be only a repetition of what you have already heard.

"Through the efforts of this association property has been acquired for a new park in the Mission District and a large portion of the property required to connect Golden Gate Park with the Presidio.

"I am assured that a stately public library will soon adorn my estate, because a large portion of the site selected has been secured.

"Years ago my boys voted bonds to purchase the land necessary to extend the Golden Gate Panhandle to Van Ness avenue; but, because a new charter went into effect a few months later, a High Court decided that proceedings begun under the old law could not be completed under the new.

"This establishes the fact that bonds voted at the present time would be legal, and I hope to see this great work accomplished in the near future.

"It is a fact to be deplored that my children build houses and place them out on the sidewalk line. This is done, I presume, so that their neighbors will not cut off their view up and down the street. They do not stop to think that a view of the street through a vista of shrubbery and bright flowers would be far more delightful and cheering to them, to say nothing of its effect on the eye of the passing traveler.

"I have wished so much that my older and established children would follow the work of the before-mentioned organizations and beautify their individual property as the clubs improve my estate.

"I appreciate the work of architects when they design an ornate or stately building; but I commend both the owner and the architect when the building is set back from the lot line, making possible a garden front. Of course, I realize that in some places land is too valuable, so that setting away from the lot line is impracticable. Land is never so valuable as to affect a flower shelf's cost, however; and as I rarely see one of these, I have come to the conclusion that the majority of my children do not care to see me becomingly garbed.

"I have provided nice parks in all parts of my estate, so that the children can enjoy the fresh air and rest their tired bodies on a bench or the cool, refreshing grass.

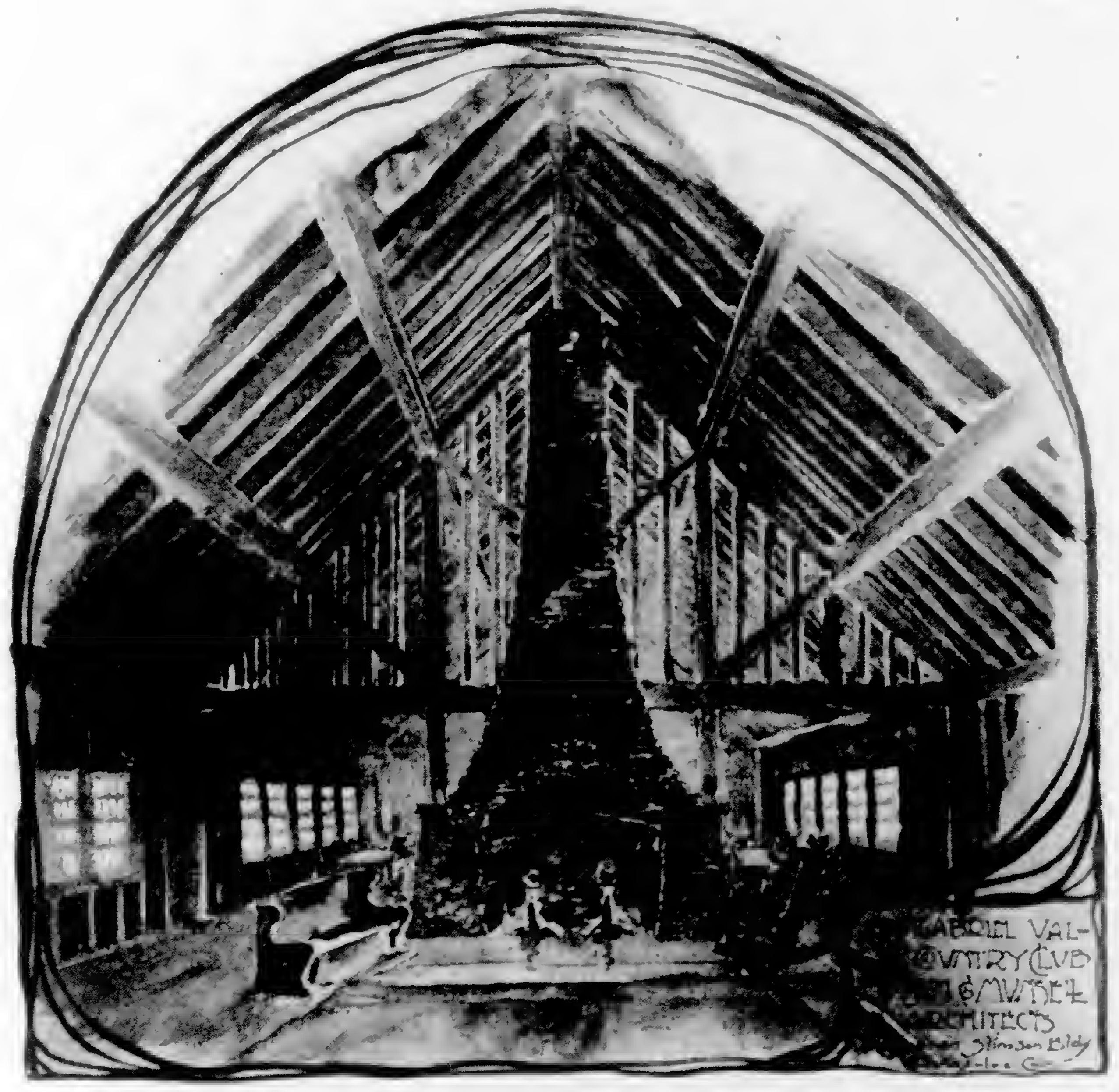
"The laying out of these parks was left to caretakers or gardeners, and they have adorned the smaller ones with trees and shrubbery. Flowers are rare because some people with no appreciation for the beautiful destroy them.

"Golden Gate Park, the largest one that I own, is famed the world over for its winding and tree-lined drives that take you from a sun-baked street to the cool breezes of the ocean; its ever-blooming flowers, the statues that greet you with silent majesty as you turn from a tree-shaded corner, its conservatory of tropical plants, its deer and buffalo paddocks and its aviary.

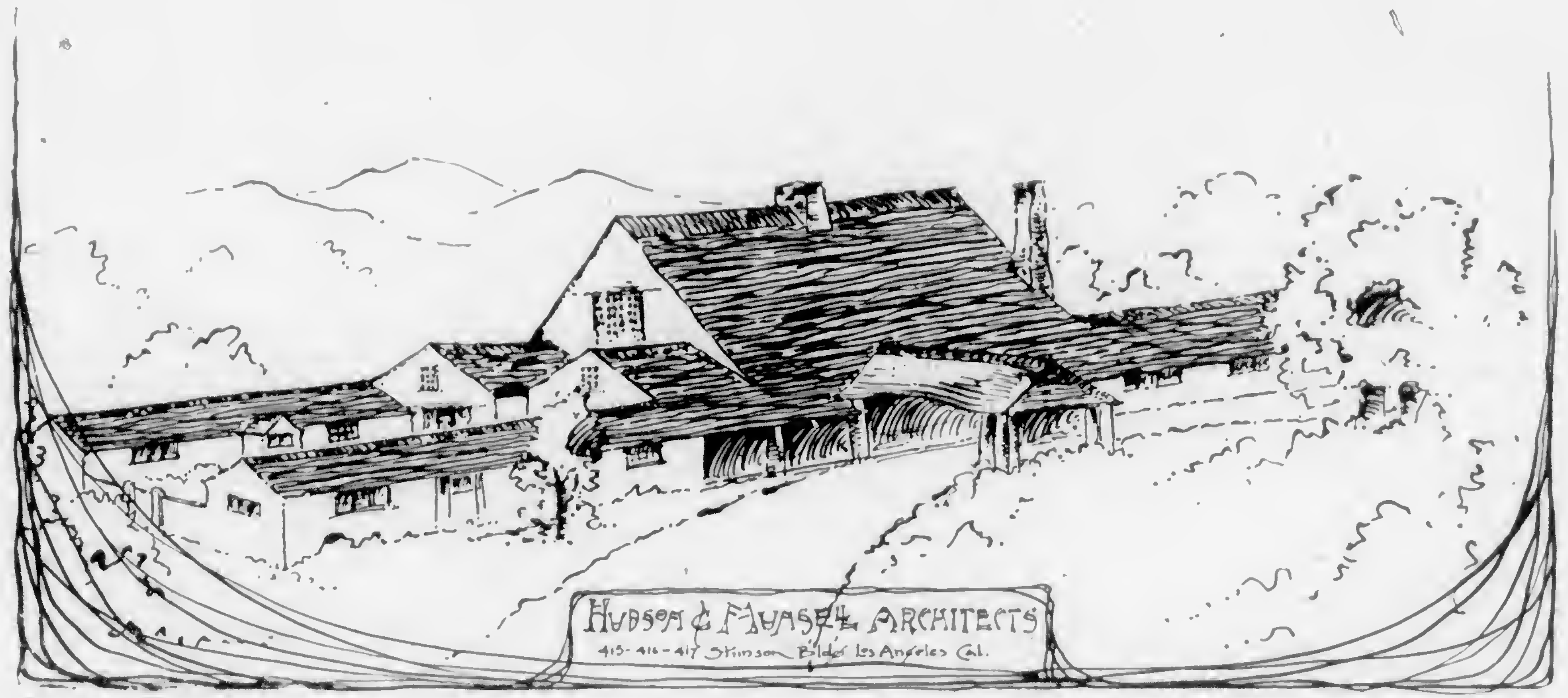
"Out on the Pacific Heights my more fortunate children are building grand houses and laying out gardens which show they at least have cultivated the civic pride so much desired for others by the Adornment Association.

"The Adornment Association's work will soon show itself in a fine Bay Shore Boulevard below the Pacific Heights and along the north shore. The marine view obtained from such a boulevard could be equalled by no other city in the world. It will also try to improve my ocean boulevard, to build an opera house, auditorium, art gallery, aquarium and an observatory on some prominent hill, say, for instance, Buena Vista Park on Haight street.

"As far as my public places are concerned, their beauty is assured. My one great hope is that my children will improve in their artistic tastes and beautify their homes. I think this will be accomplished in a few years, so, in bidding you farewell, my dear Goddess, I will extend an invitation to call again in the near future; now that you have opened my eyes, I can promise you some wonderful results."



Lounging Room, San Gabriel Valley Country Club *Hudson & Munsell, Architects* C-318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San Gabriel Valley Country Club *Hudson & Munsell, Architects* C-319

A Clever Country Club House

By WILLIAM KNOWLES, Architect

THE solution of the problem to embrace important requirements in a country club, both social and athletic, appears to have been solved in a very clever manner by Messrs. Hudson & Munsell, architects, of Los Angeles. The generous, low and spreading porches planned by this firm in sketches of the San Gabriel Valley Country Club, at once give a welcoming effect to the club's members and visitors. The spacious lounging-room and dining-room are divided by an immense chimney—a treatment that is both unusual and effective.

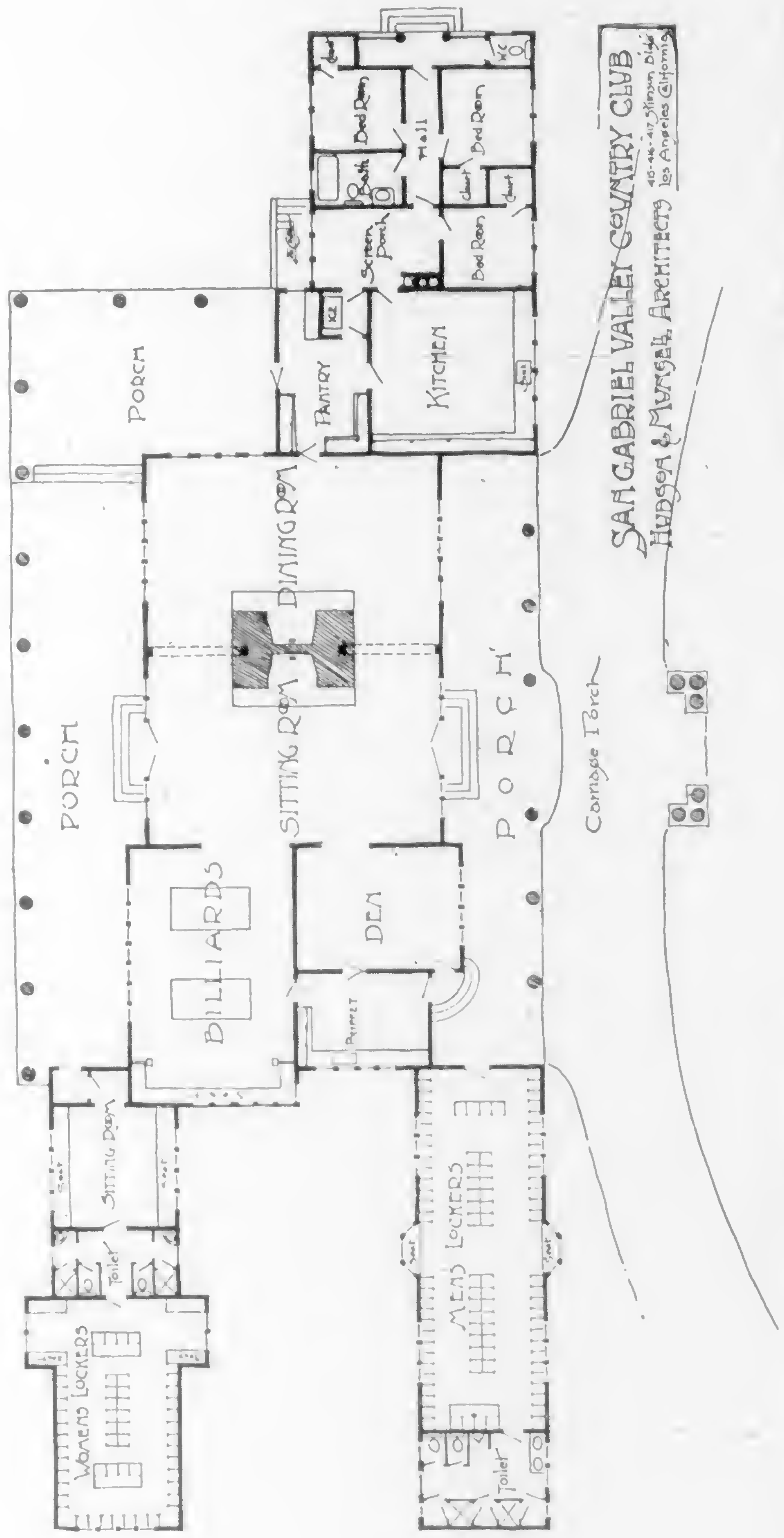
The ceiling, with its simple trusses exposed, adds greatly to the charm of these two rooms and affords an abundance of good air. The kitchen, servants' quarters and pantry are well placed and well equipped. The buffet also is fortunate in its position, being next to the billiard room and den and removed from the dining room and lounging room.

That portion of the building devoted to athletics is in two remote wings, although easily accessible from the main building. The entrance to the ladies' lockers is well planned, being screened by a small vestibule, which leads into a delightful, sunny sitting room. Off this we have the lavatories. Then come the alcove dressing-rooms and lockers. As the gentlemen were more favored in the main building regarding minor comforts, their locker rooms have not some of the accessories that the ladies possess; in fact, the space is taken up entirely for lockers and lavatories.

The perspective shows a clever handling of the roof line, the long horizontal lines predominate and give the effect of the low, restful, quiet country life. The roof over the two locker wings is nicely brought into the main roof with two minor small gables, which also have their ridges running in the same direction. The simple, clean sweep of all these parallel lines make an unusually simple but pleasing composition.

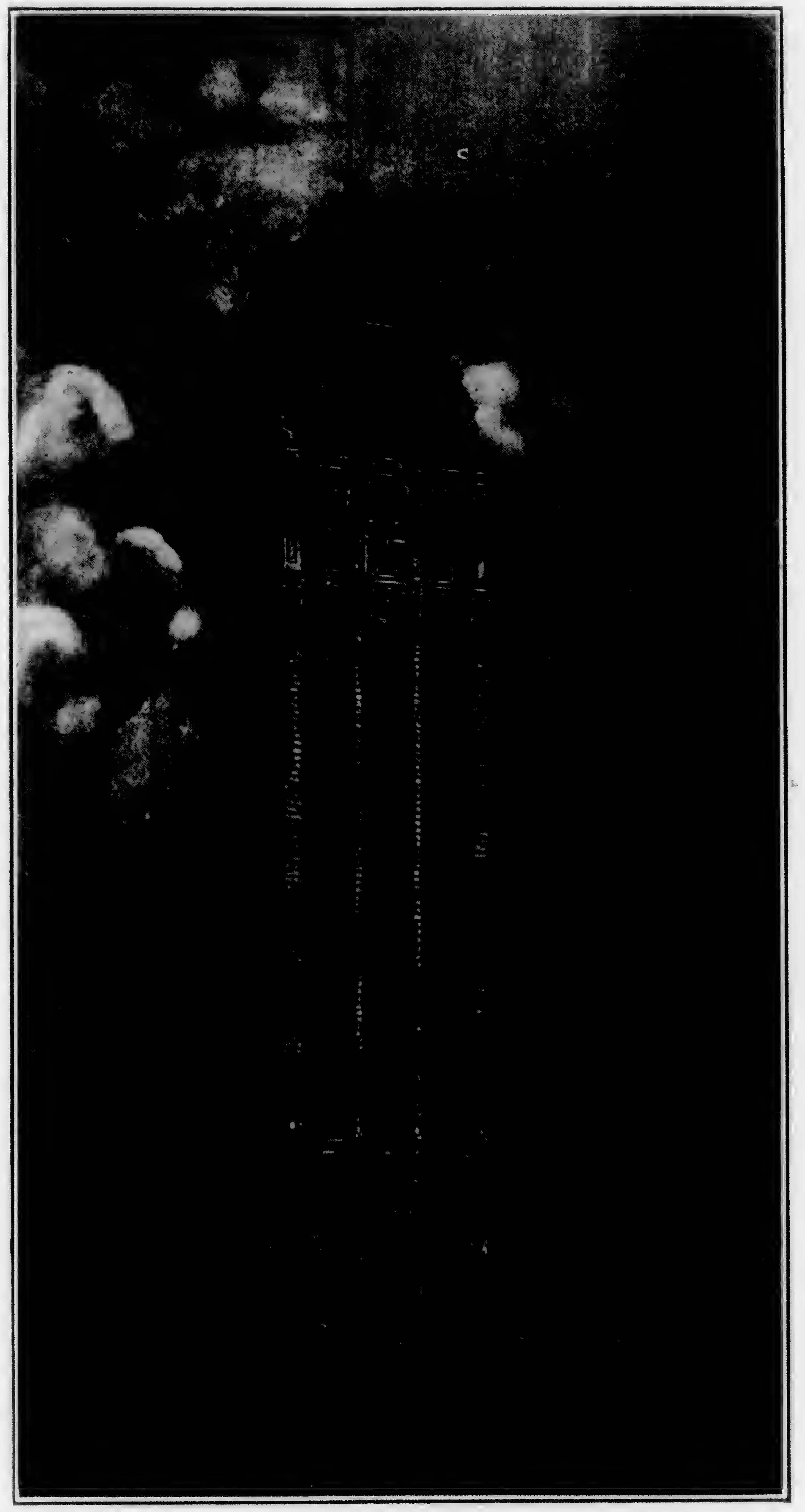
* * *

If some men were paid only for what they know they would never possess more than thirty cents.

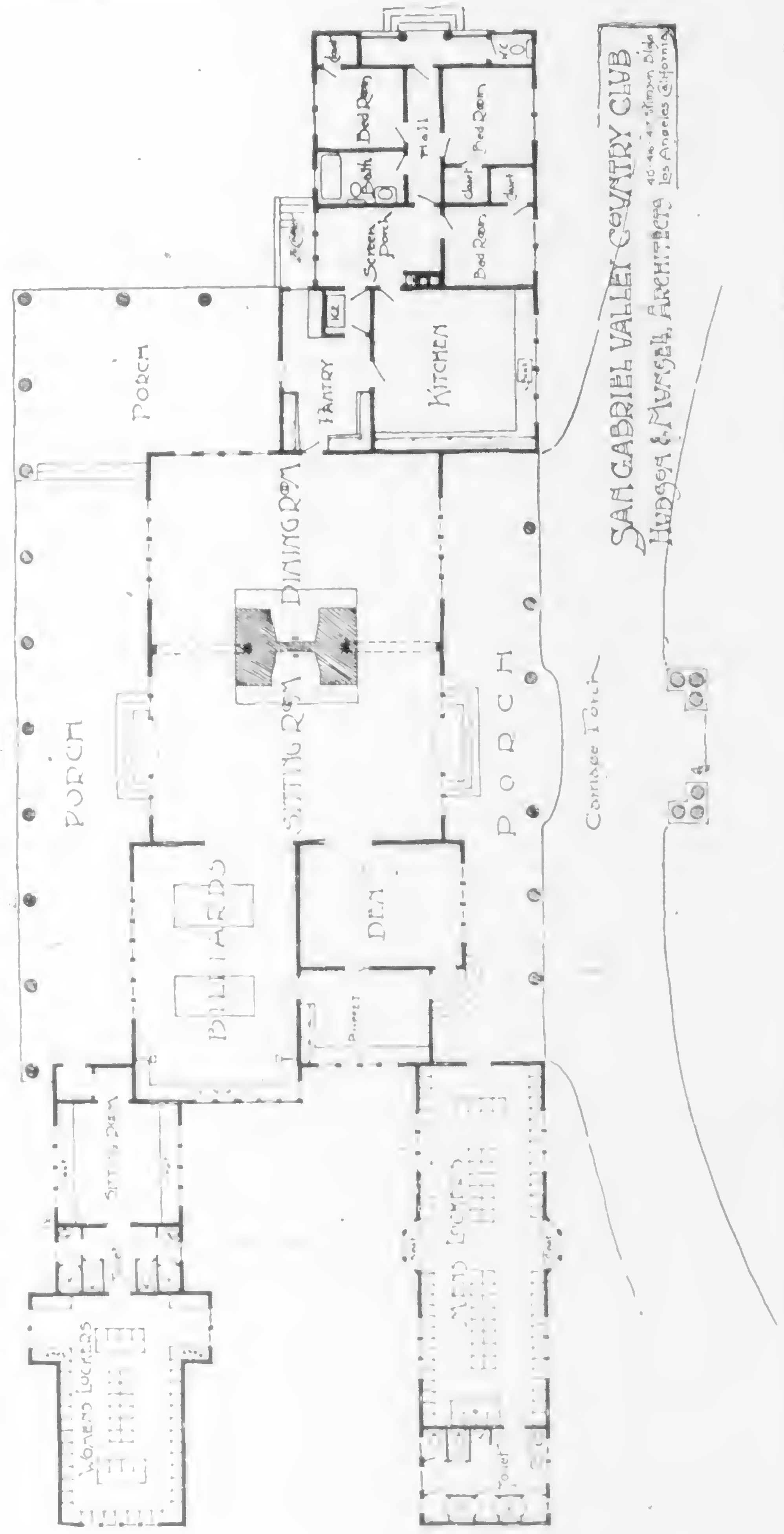


Floor Plan, San Gabriel Valley Country Club

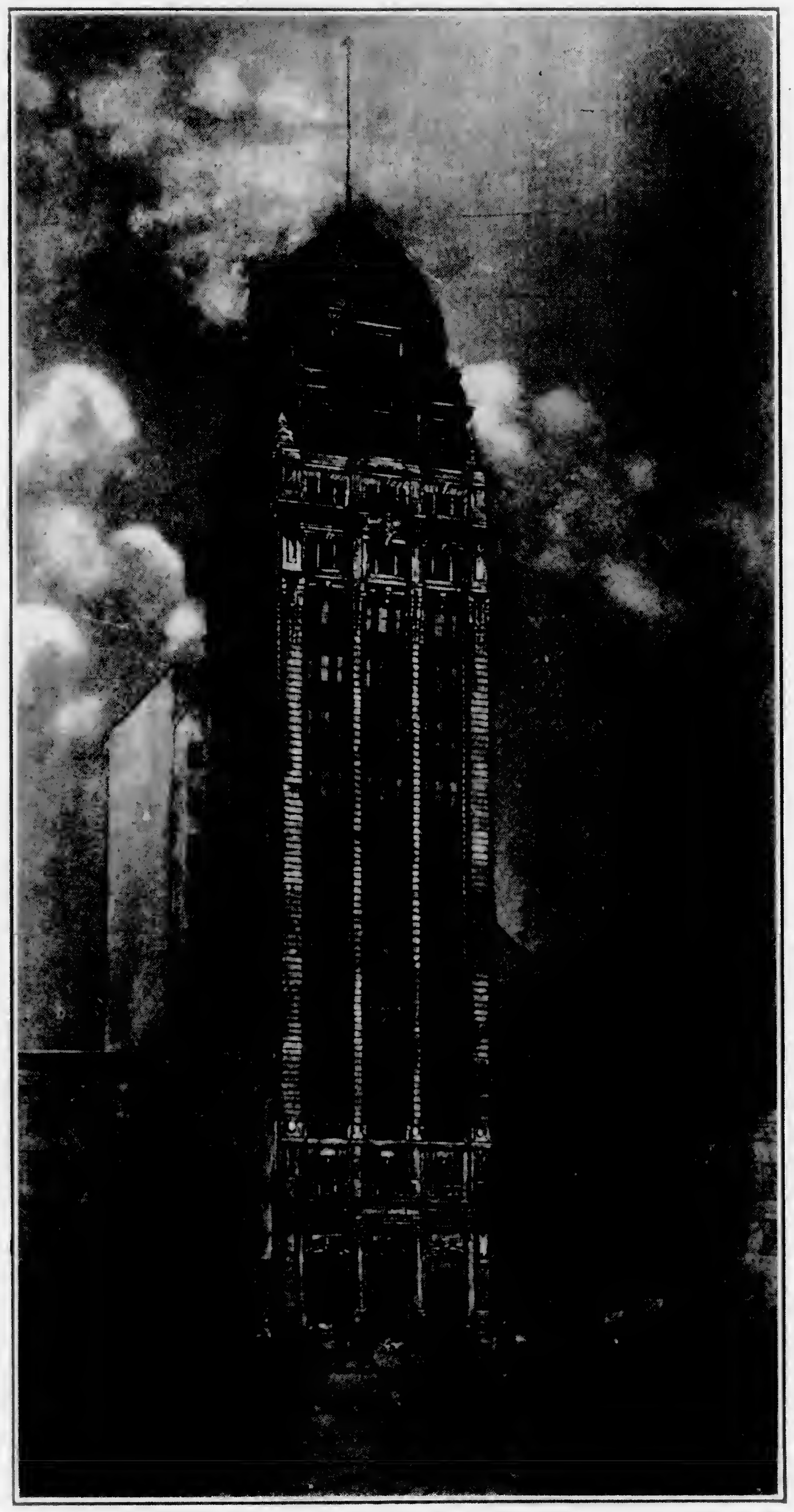
Hudson & Munsell Architects C-320



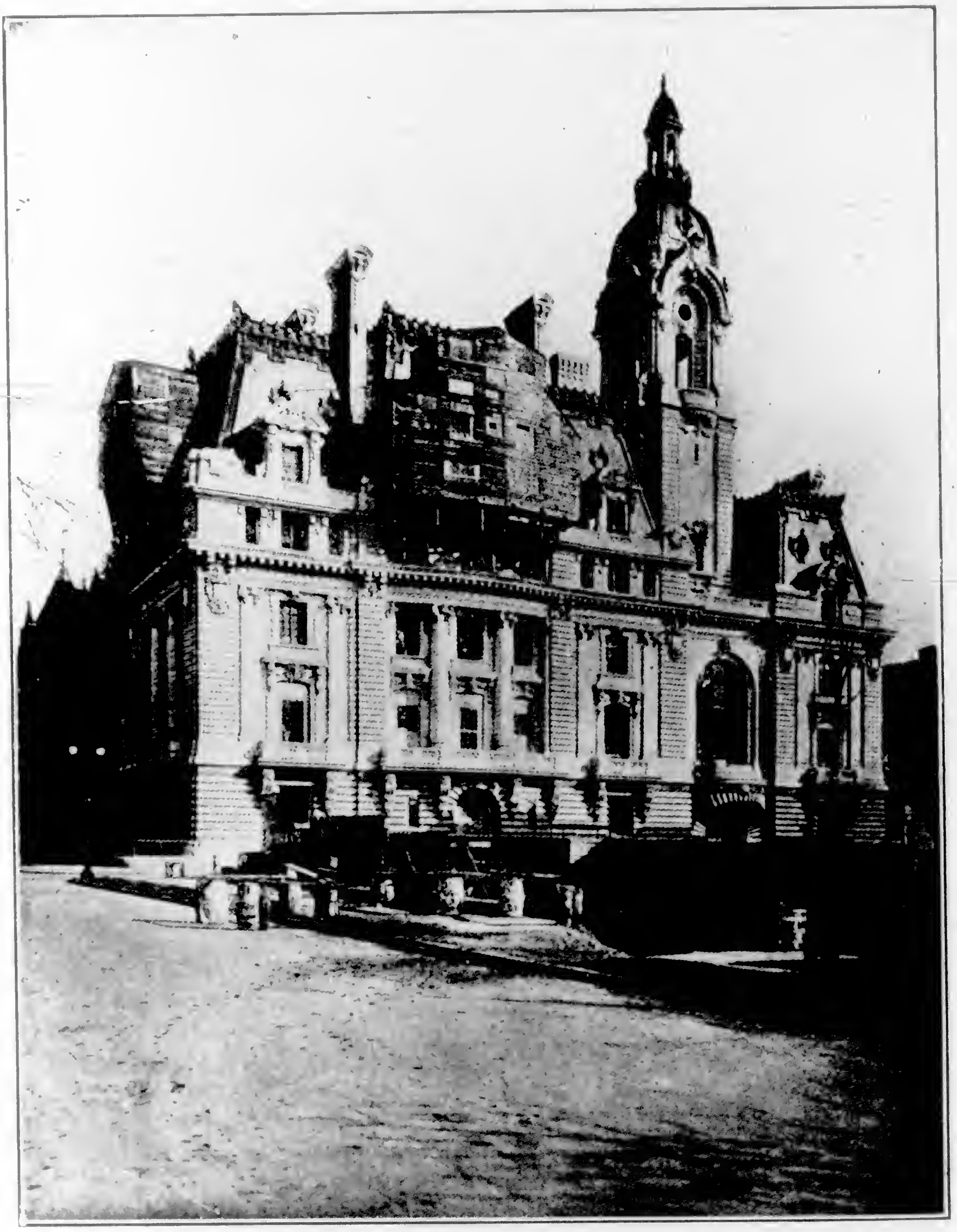
Humboldt Savings Bank, San Francisco Meyer & O'Brien, Architects C-348



Floor Plan, San Gabriel Valley Country Club *Hudson & Munsell, Architects* C-320



Humboldt Savings Bank, San Francisco *Meyer & O'Brien, Architects* C-348



The House of Senator W. A. Clark

C-322

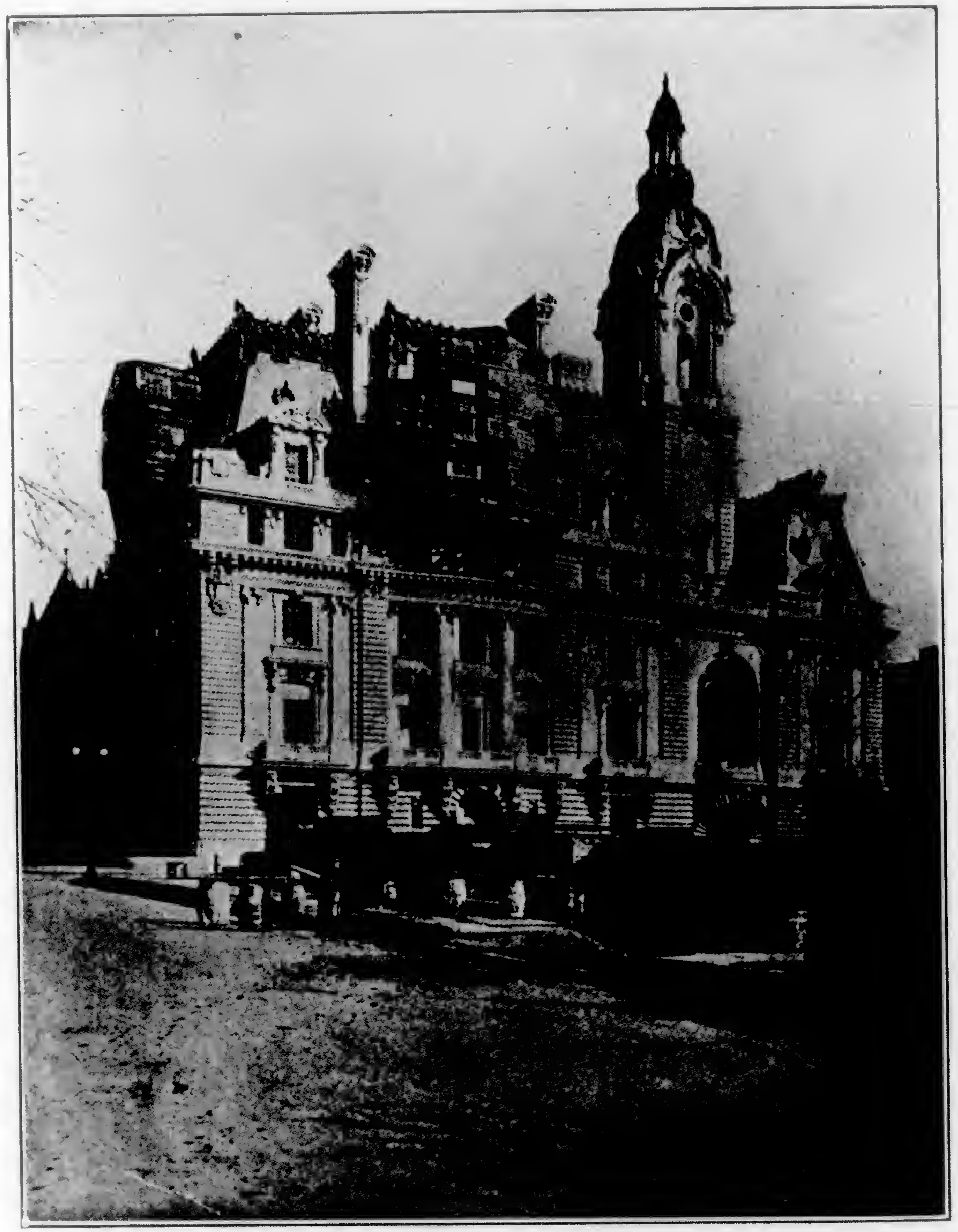
The House of Senator Clark—An Architectural Aberration

A CASUAL criticism in a weekly paper not long ago observed that the Clark house, which has been standing unfinished so long and inviting speculation at the corner of Fifth avenue and Seventy-seventh street, would have been an appropriate residence for the late P. T. Barnum. Therein the casual critic criticised better than he knew, for thereby hangs a tale. Barnum did build a house. In fact he built two. But the later, "Waldmere," was a decent and inoffensive villa, such as any prosperous Bridgeporter might have erected for himself at the date of its erection without exciting wonder. Its predecessor, "Iranistan," was distinctly projected as an advertisement, and an adjunct to the "show" business, in the interest of which the owner trotted out an elephant to plow his grounds in sight of the New York and New Haven trains, as often as these went by. This ostentatious addiction of the elephant to agricultural pursuits elicited letters to the owner, inquiring about the animal's utility, and in particular how much he could draw, whereto the genial old humbug was accustomed to make answer that he calculated the plow-elephant would draw twenty thousand people to the show! But that is another story. The story of the house is that Barnum's agent went to an architect in New York, then young and struggling, now aged and eminent, and explained his principal's desires. The architect, in whose professional equipment a sense of humor was included, saw at once what the showman desired, and hilariously determined to give it to him.

In Xanadu did Kubla Khan
A stately pleasure dome decree.

Taking his cue from the name he projected an Oriental pipe dream of a sham palace, breaking out at top into an extravaganza of towers and domes in lath. The client was enchanted when the agent showed him the drawings, and the work proceeded under local superintendence at the site. Years afterwards the architect happened to be in Bridgeport, and took an excursion to the result of his own machinations. According to his own report, he found it ridiculous beyond his most sanguine hopes and the Mephistopheles within him suggested a call. The door was opened by the showman himself, to whom the stranger explained that he had been struck by the beauty of the edifice and desired to know the name of the architect. True to his professional instincts the showman declared that the design of the house had been the subject of an international competition, and that he had paid $10,000 for architects' fees. At that—"No, you didn't," broke out the indignant visitor, and with characteristic quickness the showman rejoined, "Is your name ——?" (which it was)—"Come in."

That was the day of small things. Certainly the owner of this latest piece of showman's architecture has not gotten off for the figure to which the Barnumic imagination stretched his expenditure for architecture. The commission has served to split an American firm of architects into its constituent atoms, and to "compromise" an eminent French architect. The general belief has been that it was the eminent M. Deglane who sold the gold brick to the Copper King, and that all the "Johnny-on-the-spot," if we may use so cheap an expression about so expensive a work, had to do was to superintend the execution of the imported and imposed design. A recent statement, however, which has the air of authenticity, from the local architect, explains that this



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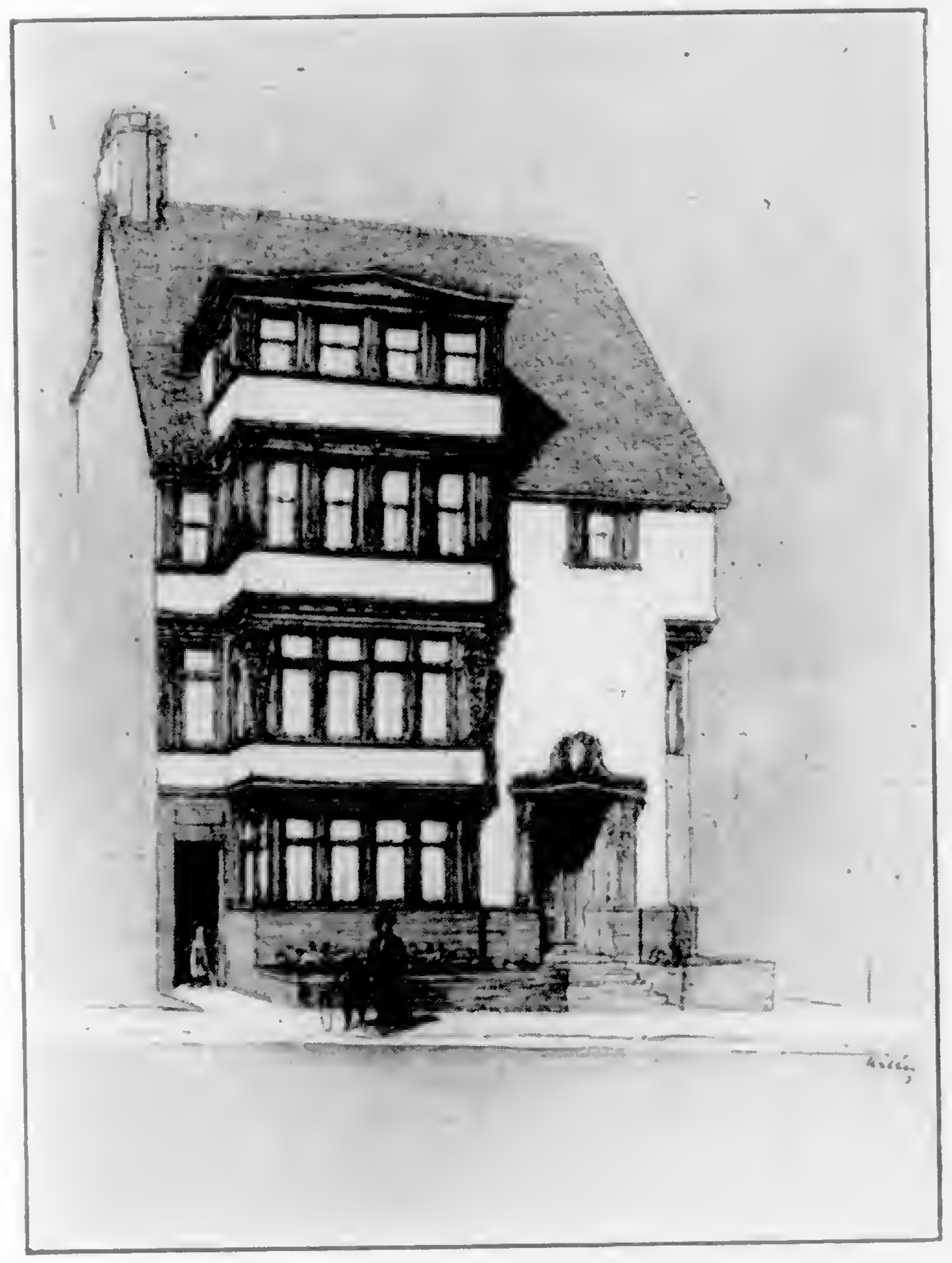
What, of course, strikes everybody first about the house is its huge pretentiousness—what you might call its rocky cheek. It is, as the cheerful Lawson, picking his words with his usual success, calls it, the "biggest, boldest, brassiest example of American domestic architecture. It is true, and the fact is so far unredeeming that it also has great massiveness along with its brassiness, and gives promise of a long endurance. Should its room come to be recognized as better than its company, it will be correspondingly costly to demolish. Possibly the next most costly house on the avenue is that of Mr. Carnegie, designed quite on the opposite and British principle of the avoidance of pretense. The "Steel King" is said to have instructed his architects that he distinctly did not want and would not have "a palace," as he distinctly has not got one. The Copper—or shall we follow Lawson and say Brass—King seems to have instructed his that he did not want and would not have anything else, and they have bettered his instructions. The modesty and retirement of the Carnegie house are emphasized by the ample foreground of reservation behind which the mansion shrinks, an enormously costly expedient for preserving comparative privacy, which is characteristically British in the manner of the British owner who is willing to spend more money to avoid pretensions than it would cost to have them. Nobody would think of calling the resulting homeliness beautiful, but nobody could fail to recognize it as gentlemanlike. It takes a back place and talks in a low tone, while the other, on tiptoe at the building line, and "built to the limit," yells, "Come and look at me!"

"Built to the limit" is not quite true. At the north end of the seventy-five feet frontage on the avenue, at the east end of the two hundred feet or so of frontage on the street, the extremities decline and retreat. But this declension and retreat throw out all the more into the street and the avenue the central mass which they frame, push it forward like an obtrusive umbrella into the public eye. That would be well enough, perhaps, if the motive of the avenue front, the order "distyle in antis," had been merely repeated at the center of the longer front and its plane. That would have resulted really in a colorable imitation of the Faubourg St. Germain, in so far as the hotel of the Faubourg, secluded "entre cour et jardin" can be guessed behind its jealous screen, instead of being turned out naked into the street, with the effect of indecent exposure. This effect is greatly heightened by the bulging of the central feature on the street front, with no discoverable or imaginable motive but to force it more unescapably on the public view. One may protrude a bay to gain a better and more commanding view for the inmates. But in that case one does not proceed to block up and shut out the view by withdrawing the sides of the bay to the bottoms of reveals as deep as the order, thus nullifying the whole arrangement. It is impossible to attribute to the bulging of the central feature on the long front any more artistic or creditable motive than to obtrude it on public notice.

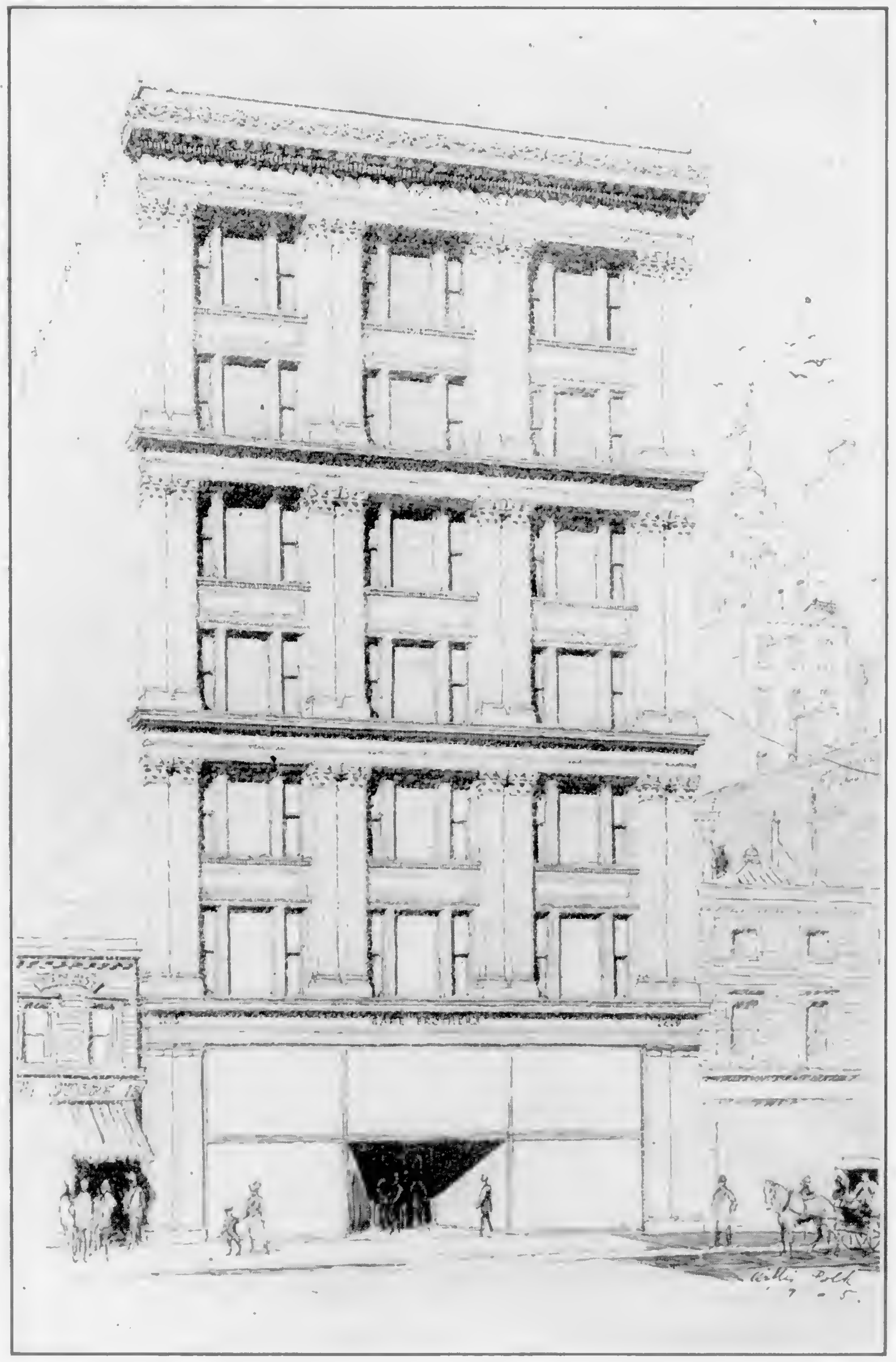
Meanwhile, there is a feature that might be properly protruded, granting the propriety of its existence at all. That is the steeple, belvidere, or what not, two-thirds of the way down the side street. The crowning lantern of this and much of what might be called the belfry stage are visible all over Central Park, and much of the up-town region, where they "advertise mystery and invite speculation" upon what sort of meeting-house can possibly have been of late erected in the region indicated. Nobody could possibly infer from the size, shape or treatment of this crowning member that it denoted a dwelling house. But when one comes near the actual site, the steeple is rendered invisible by being withdrawn, one might almost say modestly, far behind the plane of the front, and left without visible means of support. In fact, instead of the emphatic solid one has the right to expect, if not to demand, as the basis of such an erection, it is represented, in the plane of the front wall, by precisely the largest, and, by reason of its treatment, as well of its dimensions, the weakest void in the whole edifice, the great arched opening which has at its base the ferociously corbelled balcony projected, at a huge cost in stone cutting, most obviously to carry nothing but itself. A more meaningless and fatuous feature than this steeple it would be impossible to find, even in the wildest vagaries of our domestic architecture. It is entirely without architectural relation to anything else in the building. It is devoid of apparent use as of meaning or beauty. No human creature can decently pretend to admire anything about it.

Justice, it is true, requires the admission that the massiveness is apparent as well as real. The angle piers are of unusual breadth and power. The relation of voids and solids gives the sense of openings real framed—a sense which is worth having, perhaps even at the cost of also having interiors gloomily dark which practically require lighting from the outside. The treatment, in the matter of stone cutting, is adapted to promote this sense of massiveness to promote it to a rivalry in this respect with the fortified palazzos of Florence, let alone the degenerate chateaux of the Ludovican period in France. The ferocity of the stone cutting is, in fact, so unmitigated that the basement seems to have had as its prototype rather a log-house than any extant construction of masonry. Justice, again, requires it to be said that the designer appears to know his style. If he everywhere overbloats his detail and exaggerates his scale until the effect is what he might call "gonfle" or "bombe," yet the esteemed M. Deglane, if his approval was limited to deciding that the thing was "grammatical," would probably not have been justified in withholding that approval. Only, there is not a bit of this detail upon which any human creature can pretend, again, to look with pleasure. A certified check to the amount of all this stone carving, hung on the outer wall, would serve every artistic purpose attained by the carving itself. The comment the spectator is moved to make, and must make, is only the comment of Mrs. Carlyle's famous house-maid on the Sistine Madonna: "Lor', Mum. How expensive."

Unfortunately, no degree of vulgarity, of "boldness and brassiness" can make a New York house an "aberration," in the dictionary meaning of "a deviation from the customary structure or type." Or at least it would not have done so a few years ago. But the Copper King and his architect seem unaware that boldness and brassiness are going out of fashion in house building, and that modesty and a sense of home-like seclusion are coming in. The Clark mansion would have been centrally "in it" half a dozen years ago, when it was projected. But it will be hopelessly "out of it" when it comes to be completed, and antiquated and old-fashioned while it is still brand new. Which will be the most just and severe Nemesis that could possibly overtake an edifice which could at no time have any better claim upon anybody's attention than that it was in the height of the mode.—Architectural Record.



Residence of Mr. James Otis, San Francisco — *Wright & Polk, Architects* C-323



Bare Building, San Francisco — *Wright & Polk, Architects* C-324

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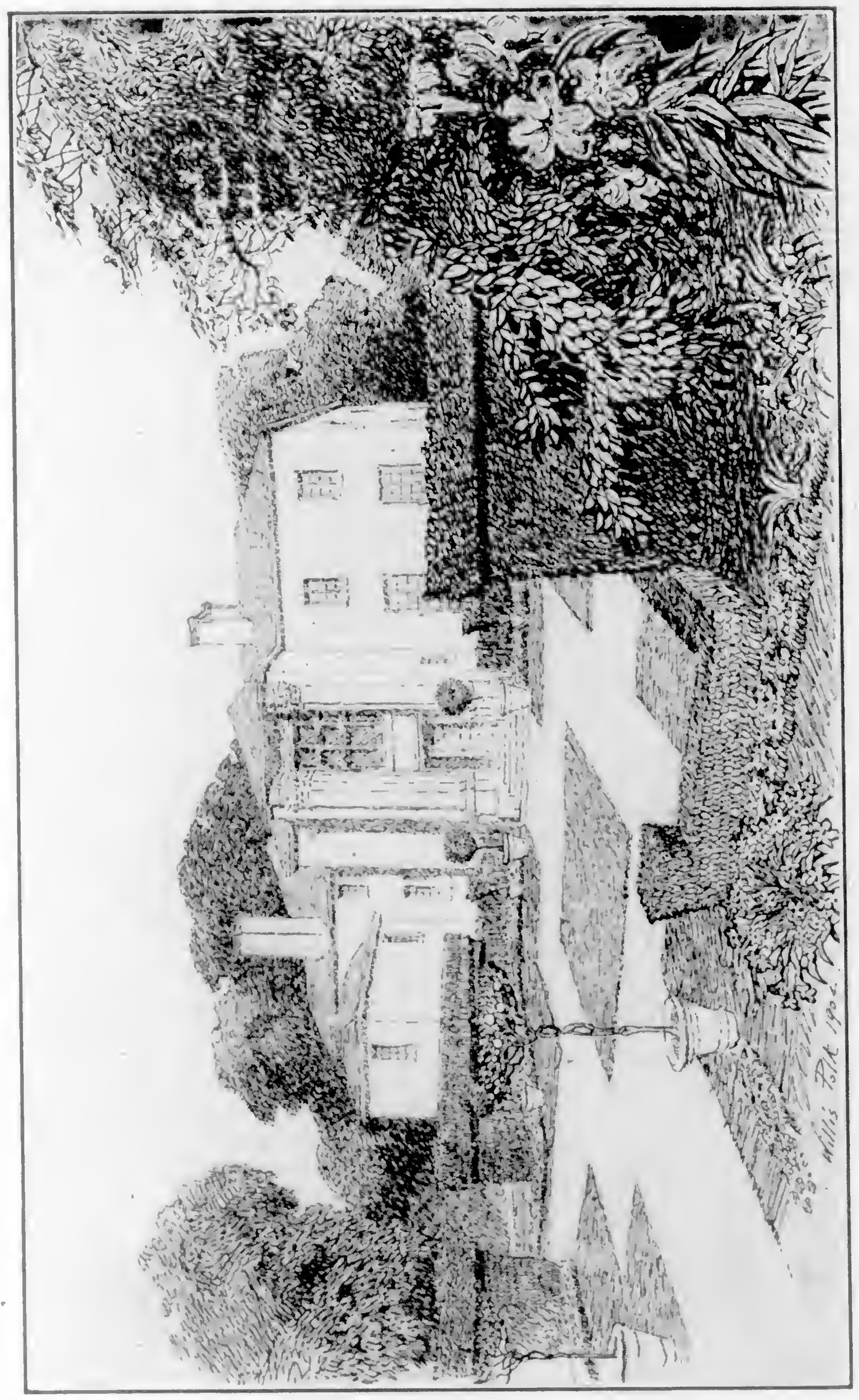

Residence at San Mateo

Wright & Polk, Architects C-325

Various Uses of Cement

Extract from Address of President Richard L. Humphrey before National Association Cement Users

IT is my pleasure to address you as President of the Association which was launched so auspiciously at that memorable convention in Indianapolis a year ago. It would appear particularly fitting on the first anniversary of this Association that such an address should dwell on the development in the uses of cement.

It is an old but true saying that "there is nothing new under the sun," and I am taking this opportunity not for the purpose of relating anything new, but merely to refresh your memory on the facts concerning the increasing uses of cement, thereby leading up to the story I hope to be able to tell you tomorrow morning.

The very full programme which had been arranged gives promise of so much interesting information that I shall endeavor to make these remarks as brief as possible.

The use of cement is very old. That the ancient Phoenicians and Egyptians understood the use of mortar is attested by the ruins of their massive masonry structures—the joints of which contained hardened mortar.

It is stated by some writers that there is evidence of the use of mortar as far back as 4350 B. C. That the Romans made use of mortar at an early date is shown by the writings of Vitrivius, but we also learn from Pliny that the mortars were bad, for he tells that "The Cause which makes so many houses fall in Rome resides in the bad quality of the cement."

From the downfall of the Roman Empire to the beginning of the eighteenth century the manufacture of cement seems to have been discontinued. Such cement, mortars and concretes as survived the ravages of the elements had become so hard that Roman cement acquired a reputation for quality which lead the earlier experimenters of the eighteenth century to seek to recover this lost Roman art.

You are all doubtless familiar with the impetus the use of cement received through the experiments of John Smeaton in 1756, by the patent issued to Parker for the manufacturing of Roman cement in 1796, and by the experiments of Vicat and Collet-Descotils.

Portland cement proper, however, did not receive its birth until 1824, when John Aspdin received his patent for manufacturing Portland cement, which he so named from its fancied resemblance to the building stone obtained from the Isle of Portland.

From this date to 1850 very little progress was made in England. In other parts of Europe the development from 1855 was steady and continuous.

Natural cement was first manufactured in the country by Canvas White in 1818 and reached its maximum development in 1899.

It was not until 1872 that American Portland cement was manufactured by David O. Saylor, in Pennsylvania, in an experimental way. Three years later he was able to manufacture it successfully, and our first Portland cement was exhibited at the Centennial Exposition in 1876.

The slow development of this industry was due largely to strong prejudice against the American Portland cement.

The successful introduction of the rotary kiln in 1889-1890 marks the beginning of the rapid and remarkable development both in the production and consumption of American Portland cement. This is very clearly shown diagramatically, the contrast between the capacity of the first cement plant in this country and the modern Portland cement plants having capacities of from 2,000 to 10,000 barrels per diem, is just as great as the contrast between a yearly production of 335,000 barrels in 1890 to the yearly 27,000,000 barrels produced in 1905. And this development is now not confined to one or two points, but is spreading over the entire country.

While it is true that the uses of cement in mortars for binding together masses of masonry or in concretes is very old, its use in the construction of arches, beams, columns and other structural parts is quite recent, and the remarkable development in the diverse uses to which it is put is all within the recollection of the present generation.

These uses may be grouped as follows:

(1) In mortars, binding together large masses of stone or brick, etc., or for casting various forms—artificial stone, hollow block, brick, etc.

(2) As concrete in mass or under conditions where it is only subjected to compressive stresses; and

(3) As reinforced concrete where it is subjected to both tensile and compressive stresses.

For the first part of group 1, it will be sufficient to observe that cement mortar is rapidly replacing lime and natural cement mortar.

The manufacture of artificial stone is now making progress and is successfully competing with cut stone work of ornamental character both in price and quality. In the manufacture of hollow block there has been very unusual development. Indeed, it has been so rapid, and has appeared so attractive as a field for investment that inexperienced persons with insufficient capital and experience in this new business have rushed into the field, and the result has been for poor material which has not be acceptable to the builder, and this has contributed no little towards retarding the development. This class of building has come to stay, and it will only be a question of time when matters will so adjust themselves that first-class material will be uniformly produced and it will form a very desirable substitute for brick and stone, and in cheapness will eventually compete with wood.

The use of cement has been quite general for many years for sidewalk work, and pavements of this character are by all odds the best attainable. The use of concrete for piers, abutments and arched bridges without steel reinforcement is too general to need comment. Additional information, however, is greatly needed as to the proper means for providing for the expansion and contraction of concrete in large masses. The first concrete arch bridge was built in this country in 1870, in Prospect Park, Brooklyn, and to the Erie Railroad is given the credit of having lined the first tunnel with concrete, namely that at Bergen, N. J., in 1874.

A notable development in the use of concrete for bridges is illustrated in the construction of the bridge over Rock Creek in Washington. The voissoirs for the arches of this bridge are molded separately, are then air-hammered, dressed and then hoisted into position. These blocks being handled similar to stone holes being cut for the dogs. The spaces between these rings and the spandrel walls cast in place with concrete. No sand is used in the concrete for the arch ring, the crushed rock screenings being substituted and the bluish of the rock produces a marked contrast to the color of the concrete ones in the spandred walls in which a yellowish sand is used.

Concrete sewers and retaining walls harbor, bulkheads of plain concrete are also so extensively used that they are no longer a matter of special interest.

Reinforced concrete, however, is of more recent development. The use of this form of concrete construction was probably known prior to 1855, for at the Paris Exposition in that year a system of reinforced concrete was exhibited by Lambot. In 1861 Coignet proposed a method of reinforced concrete construction. The first application of metal reinforcement for concrete by Monier was in 1867 in the construction of some very large flower pots. In 1868 Monier obtained his first patent for reinforced concrete, but it was not generally used until after 1880, although in 1879 he again exhibited at the Antwerp Exposition a system of reinforced concrete construction.

The first reinforced concrete construction in this country is credited to W. E. Ward, in 1875, who erected in New York City a house having the floors and columns of reinforced concrete. It should be noted in 1876 Thadeus Hyatt, an American engineer, published his experiments on reinforced concrete in the laboratory of Kirkaldy, London, England. The experimental work of Hyatt extended from 1870 to 1880. The first Ransome patent was taken out in 1882, and it was applied in the construction of his first building in 1884. Between 1891 and 1894 Moeller in Germany, Muensch in Hungary and Melan in Austria were pioneers in the development of reinforced concrete construction in Europe. The use of reinforced concrete on a large scale began in Germany under the system of Moeller in 1893 and Rabits in 1898. Hennebique had built reinforced concrete floors as early as 1879. It was not, however, until 1892 that he obtained a patent for his system of reinforced concrete construction.

The last ten years has seen a very remarkable development and reinforced concrete construction. At first reinforced concrete construction was used largely in the construction of bridges, the first of which was built in this country over the Pennypacker Creek in Philadelphia in 1893, and for which I had the honor of inspecting the cement and other materials as well as construction of this bridge. From this beginning the use of reinforced concrete has developed rapidly, and we find it is used in almost every conceivable form of construction—large sewers, water pipes, reservoirs, coal bunkers, pneumatic dams, chimneys, grain storage bins, bridges, buildings, being some of the many applications.

Experiments have been made in the Reclamation Service for its application in large reinforced concrete pipes of five feet in diameter and capable of standing upwards of 70 pounds in pressure, while one of the most novel and recent applications of reinforced concrete is for reinforced crib work, under the Fraser system, which it is stated costs a little more than timber cribbing, and which has been used extensively in Canada. Chimneys 350 feet in height have also been successfully constructed of reinforced concrete. The Harvard Stadium, the Baseball stand in Cincinnati, and the Stadium of the Washington University at St. Louis are all novel examples of the use of reinforced concrete, while concrete ties reinforced in various ways have been in use for some time, though they have not been satisfactory. The cost of maintenance, however, has been found to be reduced to a nominal sum, and the alignment has been found to be very easily maintained, which greatly offsets the first cost. The rigidity of the roadbed, however, has been a prime objection, and an effort is now being made to introduce an elastic cushion in the tie in order to overcome this objection.

It is in the erection of office buildings of considerable height that the development has been most remarkable. Buildings of eighteen stories in height are being erected in which the skeleton is of reinforced concrete. Considering that the use of steel for reinforcing concrete beams was not suggested until 1882, a development of this character is certainly remarkable, and we have reason to pause and consider whether such extreme development is wise.

While visiting a large city recently I had occasion to inspect a building of several stories in height in which cinder concrete was being used in the structural parts. The contractor, in reply to my surprised query, stated that the building was still standing. This was indeed true, but what was the margin of safety in this structure? As this concrete had a compressive strength of about half of what could be expected from a fairly good concrete, the factor of safety had therefore been cut in half. In further explanation he stated that in order to compete with other contractors, he was obliged to use the same materials which they did. The use of inferior materials should not be permitted in reinforced concrete construction, and the present situation in the development of concrete and reinforced concrete is one that should be faced squarely. That it is possible to erect a sixteen-story building of reinforced concrete has been demonstrated, but we should have a better knowledge of the properties of this material before such a practice becomes general. Ten years' or less experience with a material in which chemical changes are constantly going on and which may be affected by the changes produced by expansion and contraction is hardly sufficient to enable us to obtain a thorough knowledge of its properties.

The American Society of Civil Engineers recognized the vital importance of this subject and recently appointed a committee on concrete and reinforced concrete with instructions to affiliate itself in its work with similar committee of the American Society for Testing Materials, the American Railway Engineering and Maintenance of Way Association and the Association of American Portland Cement Manufacturers. After over a year's work they have found that—

(1) Thoroughly reliable data upon which they can formulate a report as to the rules and formula to be used in the design of reinforced concrete structures does not exist.

(2) That the results of the tests made in laboratories of the various technological institutions are not sufficiently comparable nor correlated for the purpose of obtaining this data; and

(3) That in order to secure the requisite data it will be necessary to conduct a complete series of tests in one laboratory where the conditions are as uniform as it is practical to obtain them and where the personal equation is reduced to the minimum.

Concrete fills an important and growing field, but it has its weaknesses and its limitations, and this should be pointed out and recognized squarely by its advocates. It is evident to any one who devles into the subject that reliable data for the use in a design of concrete structure is very much needed, and the work of the Joint Committee on Concrete and Reinforced Concrete is doing in co-operation with the United States Geological Survey should receive the encouragement and support of each one present, and I would ask you to use every effort in urging upon your Congressman the vital importance of securing an appropriation for the continuance and completion of this very important work, for the attainment of reliable and uniform data for use in the design of structures in concrete and reinforced concrete will insure a more rapid, safe and successful development in the use of cement.

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Many a man is unable to stand on his dignity because his wife sits on it.

✣ ✣ ✣

There would be no labor troubles if every man had a job on Easy street.

The Causes of Failure in the Concrete Block Business*

By O. U. MIRACLE

MR. President and Gentlemen of the National Cement Users Convention: It certainly would be presumptive on my part to assume to tell you all the causes of failure or lack of success in the concrete block industry. Many theories may be found inefficient when put to practical tests, so I shall only treat the subject in the light of my own observations in the field, and shall point out the most glaring dangers which seem to confront us, in order that we may suggest remedies to overcome them.

It has been readily acknowledged on every hand that this great new industry has taken on a most wonderful and surprising growth, in fact its strides have far out-reached the fondest hopes of its most ardent advocates. In such a rapid growth, there are bound to be some new points developed and it is certainly well for us to pause at this time to examine the structure we have reared and see if there is any occasion for repairs, or weak points which we may overcome in future work.

That there has been some failures in this business, we must at once admit and it is certainly well for us to view these failures in the glaring limelight of publicity and ascertain if possible the causes in order that the proper remedies may be applied. Some one has said: "It is better to be sure than to be sorry." This is certainly an excellent motto for the Concrete Block Manufacturer. While the financial failures in the business have been comparatively few, the moral failures have been many and the latter are bound to result in financial failures in the end.

So long as a man is human, it will be out of the question to wholly eliminate the moral failures. So long as building material is made and used, there will be difference in the qualities produced, but by the application of the principles and facts already envolved, we can certainly very materially decrease the percentage of failures and not only increase the percentage of success by this gain, but by correspondingly improving the quality and utility of this material, greatly add to the profits of the business.

In looking over the field I find that these failures are due to a great variety of causes. Right here, I want to again remind the manufacturers of Concrete Machinery of the grave responsibility of the position which they occupy in this matter. The field has proven such an interesting one that it has attracted investments by men in all walks of life. Many have engaged in this business whose fund of knowledge on the subject was of necessity limited. They have largely depended on their information upon the literature put out by the various machinery manufacturers. This information has in many cases, either through ignorance of the subject, or a desire to make the proposition look more attractive than it really was, been very misleading, and the instructions given, if followed, would in many cases result in dire disaster. True, this was a new field and we all had much to learn about it, but now that we have progressed far enough into the subject to ascertain certain indisputable facts there is no way of getting away from, I most certainly urge that the machinery manufacturer, in preparing his literature, confine himself to these facts.

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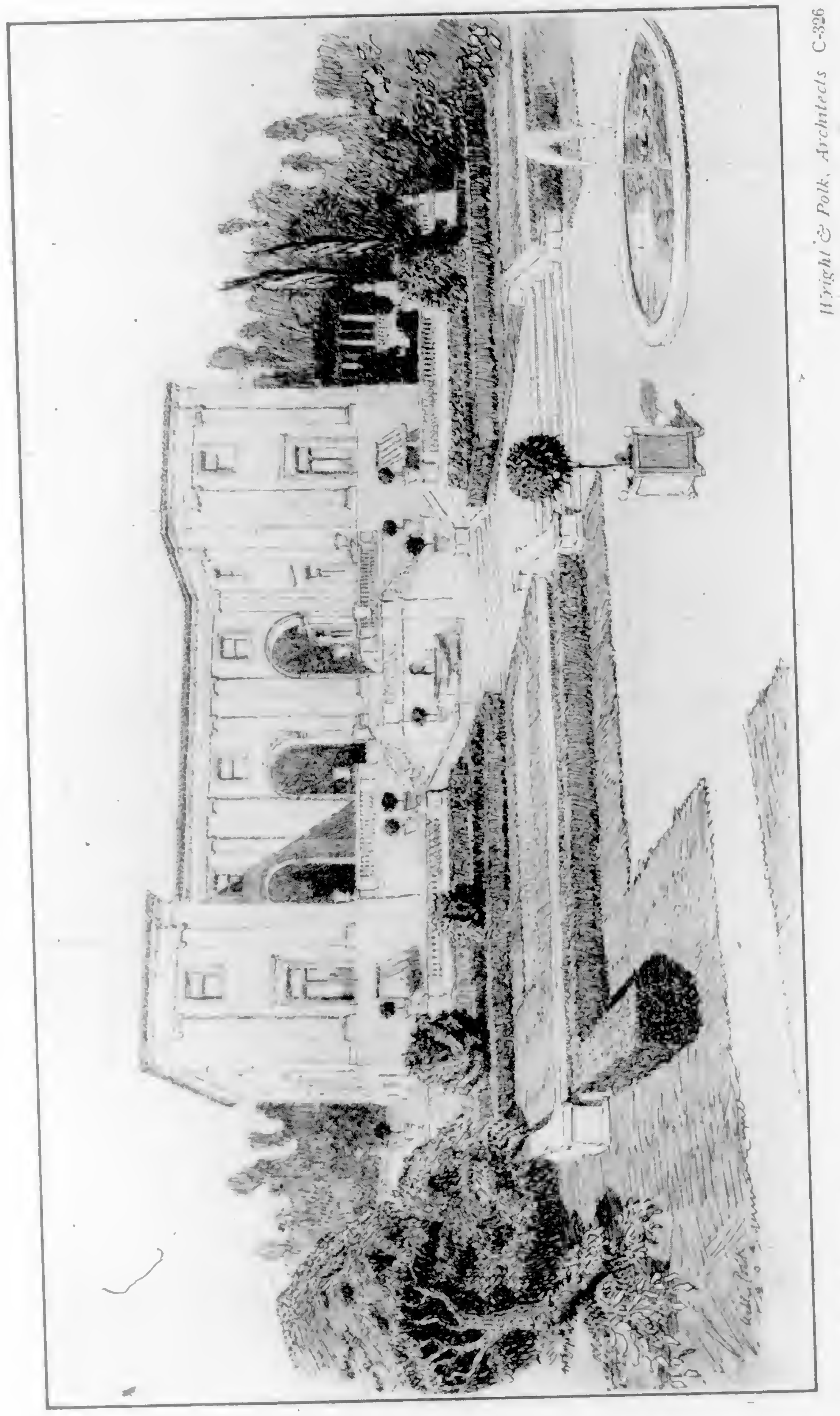
* Paper read before the National Cement Users' Association in Milwaukee, January 9th.



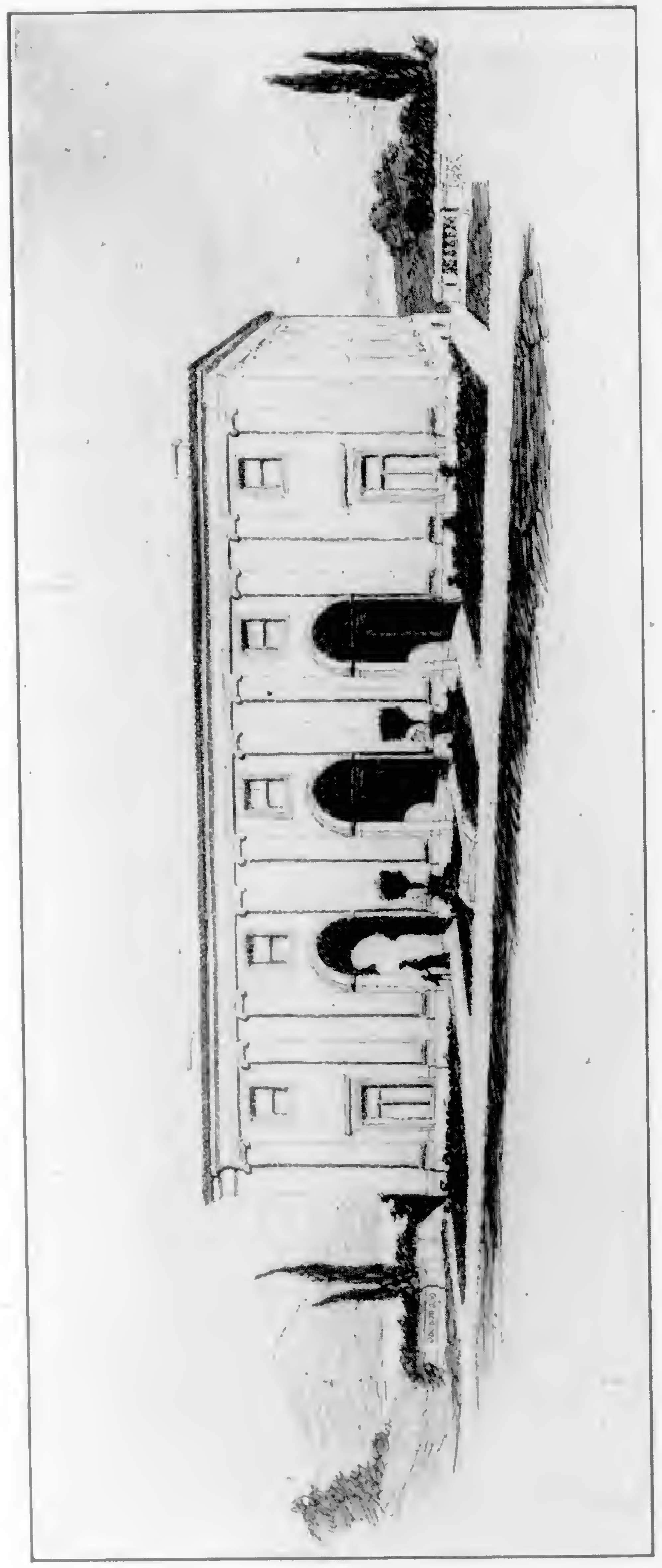
Sketch for Residence

Wright & Polk, Architects C-326

Even in the past few weeks I have seen literature in circulation from what I consider reputable concerns, advertising certain cement block and brick machines, which gave the estimated cost of the manufactured product, at less than the cement alone required to produce a good article, would cost. These figures run too ridiculously low to be worthy of consideration or repetition and indicate mixtures varying from 1 to 6 to 1 to 9 which are far too lean. While on the other hand, a gentleman who claimed to have twenty years' experience in contracting and the use of cement, told me the other day, that he had about made up his mind, to buy a certain type of machine because the manufacturer told him it pressed the blocks so hard that they could be laid in the wall the next day after making. Now with such information as this being dealt out at wholesale by men who are supposed to know what they are talking about, isn't it about time for us to start a little more extensive campaign of education? Isn't it time the public knew more about this great subject? These rash statements often come from the over-zealous salesman, but altogether too often from the machinery manufacturer himself. Their claim of results are often too far out of reason to be reached even under ideal conditions. Gentlemen, I want to urge upon you who are in the machinery manufacturing business that for the sake of the stability and integrity of this great industry, it is important that we unite in doing away with this great evil. Get down to facts and stay there. We are all human and capable of errors, but now that we know better, lets don't commit these same errors over again.

In most all estimates of cost of manufacture, I find that account has been taken only of the direct expense, no mention whatever is made of indirect expense, such as advertising, superintendence, interest on the investment, depreciation, loss from breakage, bad accounts, etc. This is by no means a "get-rich-quick" scheme, but one of the best paying and most legitimate propositions before the investing public to-day, notwithstanding the fact that some of the literature in circulation is painfully strong in having that "get-rich-quick" ring to it. There is sufficient profit in the business to place it on a much higher plan than has been aimed at by many manufacturers. The facts of the matter are, including all these extra items of expense, there is still more chance for gain in this business than in the manufacture or production of any other building material of equal strength and lasting qualities. Up to the present time we have been very lame in the lack of standard specifications for the manufacture of this product. In order to get this matter on a uniform basis, it was brought up at the meeting of the cement block manufacturers held in Chicago, last June and as chairman of a committee appointed for this purpose, I hope to have the pleasure of submitting a progress report, at an early date, and the same will be given due publicity.

While we are on this part of the subject, it may be well to call attention to the fact, that the machinery manufacturers, are not alone to blame for the placing upon the market a poor material. Many who have engaged in this business have made very serious mistakes—mistakes which are expensive, but which can be overcome. Within the past week a case has been brought to my notice, where the party failed absolutely, and his machinery, plant, stock, etc., are now in the hands of the sheriff. This man made serious mistakes and many of them. In the first place he did not attempt to secure any business on merit; he had the idea that he must always be below his competitors to get orders. If the other fellows figures on a job were five hundred or a thousand dollars, he would invariably bid 10 to 25 per cent lower on the jobs he secured.



Sketch for Residence

Wright & Polk, Architects C-327

Under these conditions, what could you expect but inferior material and poor workmanship—in the end a botch job, and worst of all a dissatisfied customer, who uses his influence against cement work at every opportunity.

It therefore comes to us most forcibly that you who are furnishing this product to the public must get together on a basis that will insure uniform product of no uncertain quality, and it will then command the price of which it is worthy. So much for the moral failures.

Then we have the man who goes into business with insufficient capital. Some manufacturer has sold him a machine or partial equipment, simply because he had the price, or a part of it. He gets credit of his local dealer to the extent of the price of a few barrels of cement at a good round price. He makes a few blocks and sells them while they are yet too green for use, in order to get funds for his pressing needs. He discovers, on account of his men being new to business, or for some other reason, that the blocks cost him much more than he anticipated, or twice as much as the over-anxious salesman told him they would. He is short on profits and has already established a selling price at too low a figure. The tendency then is to attempt to make a profit at the already established price by cutting down the amount of cement used and correspondingly increase the amount of sand. The results are too well known. He is down and out in a short time, condemns the business in general, and the machine in particular that he bought, and is not slow to discourage others. By the time the report of his failure gets into about the third or fourth hands, the conditions responsible for the results are lost sight of, and the report is spread broadcast that the business is a fizzle.

Next we come to the architect. He occupies a very important relative position in this matter, and his adverse criticism has no doubt proven a stumbling block to many of you. The value of his opinion and endorsement have been too lightly estimated by many. His position has of necessity been one of great care and caution. He is not willing to depart from fields of well-known practice for the mere novelty of an experiment. His position must be secure. In other words, "He is from Missouri, and has to be shown," but he has been a very careful student of the concrete block; and where a year or two years ago he turned a deaf ear to the proposition, he has discovered now that the material is already established, and he is willing to consider it for his requirements. But it must fill them. His first and most objectionable is, lack of quality. Assure him of this, and he is ready to make a beginning. But he is immediately confronted with the question of appearance and utility. His objection as to the appearance is certainly justified by certain glaring examples. It is lamentable that a material so easily susceptible to artistic designs has been so shamefully treated. Each of you can bring to your own mind a building of concrete blocks, every one of which is exactly the same size, and the same style of rock face design, with no sign of an attempt of ornamentation. There is no legitimate excuse for this neglect, and do you think there is any wonder that Mr. Architect finds fault with the appearance of this kind of building? Certainly not. He can get the same appearance with the cheapest kind of boards covered with still cheaper stamped sheet iron. He wants more variety of designs, and if you will set about it, there is nothing easier than for you to give it to him. True, additional designs means added expense, but you will be placing the business on a higher plane, and your profits will increase correspondingly.

I have visited many yards where the owners were making less than half the designs and sizes of block their outfit was capable of turning out. While it is true there has been a demand for this rock-face block, which you all make, I hope the time will soon come when you will get away from this idea entirely. It is at best but an imitation. As I have said on other occasions, I believe that this material is entitled to a distinct classification of its own, and a building made of it should be designed as a concrete building, and not as artificial stone, as so many call it.

One of the handsomest buildings I have ever seen of concrete was made of all plain face blocks for the body of the building, with bevel coigns at the corners and openings, with a few ornamental designs utilized as belt course and cornice.

Another just objection of the architect is the extreme prosity or lack of impermeability of many blocks. This, combined with the strength of the material, is the all important part of this proposition, and these objections are being rapidly overcome. This comes properly under the subject of manufacture and specifications, and I shall only touch lightly upon it, as so important a subject is worthy of more lengthy consideration. The results obtained in this direction depend upon the five following vital points:

1st—Proper selection and proportioning of materials.
2d—Careful mixing and complete incorporation of the ingredients.
3rd—Careful and thorough tamping.
4th—Care in curing.
5th—Care in laying.

Proper Selection and Proportions of Materials

Under this subject naturally comes the selection of the cement, sand and aggregates. The cement should in all cases be a first-class Portland, guaranteed to stand the tests required by the specifications for Portland cement, adopted by the American Society for Testing Materials. In the selection of sand and aggregates the greatest care should also be exercised. I maintain that sand should be practically free from clay, loam or other soluble matters, notwithstanding the fact that many tests have shown that a small proportion of clay is not harmful. I believe it to be a very dangerous practice to recommend the use of sand containing any perceptible amount of clay, from the fact that the average worker has no facilities for determining the percentage found in his material. If possible the sand should be graded in sizes, so as to reduce the voids to the smallest possible amount. The percentage of cement used with the sand should be such as to perfectly fill these voids. For determining the voids, the water test may be employed without laboratory facilities.

Average sand is found to contain 25 to 35 per cent voids, indicating the necessity of using this percentage of cement to make a perfect sand cement mortar.

Where aggregates are employed the voids in the aggregate may be determined in the same manner as they are in the sand, and an amount of the sand and cement moisture equal to the amount of voids in the aggregate should be used to make a perfect stone.

Careful Mixing and Complete Incorporation of the Ingredients

Machine mixing is at all times preferable and invariably produces a better concrete by at least 10 to 15 per cent, than can be made by hand mixing. The materials should be thoroughly incorporated and mixed until of uniform color.

When an aggregate is used, the sand and cement should be well mixed first, then the aggregates and water may be added at the same time.

I believe that with any of the machines now on the market a much wider mixture can be used than is generally employed, if proper care is taken of the face plates. The face plates should be kept clean with a wire brush and be given a coat of oil or shellac as frequently as once a day.

Careful and Thorough Tamping

The tamping should commence with the placing of the first shovel full of material in the mold, and should continue until the mold box is full. A small face tamper should be used, and quick, sharp blows should be struck.

Many unsightly buildings have been put up of blocks which showed unevenness in their texture on account of careless and uneven tamping.

Care in Curing

No part of the manufacture of concrete blocks is more important than the curing, and I regret to say that this essential part of the manufacture is altogether too frequently disregarded.

Blocks should be kept moist for at least seven days after making. The water should be applied with a spray or sprinkler immediately after the initial set has taken place, or as soon as it can be applied without washing the stone.

Another fault that I have discovered in this connection is the fact that many yards do not carry sufficient stocks of blocks on hand. They wait until they have secured the contract before making the stone, and they are in this case rushed into the building too green, and bad results will inevitably follow.

No concrete stone made in the manner above described should be laid in the wall until it is at least thirty days of age.

Green blocks should never be exposed to the rays of the sun or warm currents of air during the first seven days, when they are supposed to be kept moist.

I have seen in the early stages of this business blocks made under an open shed, immediately placed out on a hillside, exposed to the sun and wind, with no water applied, except such as was pumped with a common wooden pump and carried in buckets, and you all know too well the results that come from this careless haphazard method.

Is it any wonder that blocks made in this manner are porous, or that they absorb moisture readily?

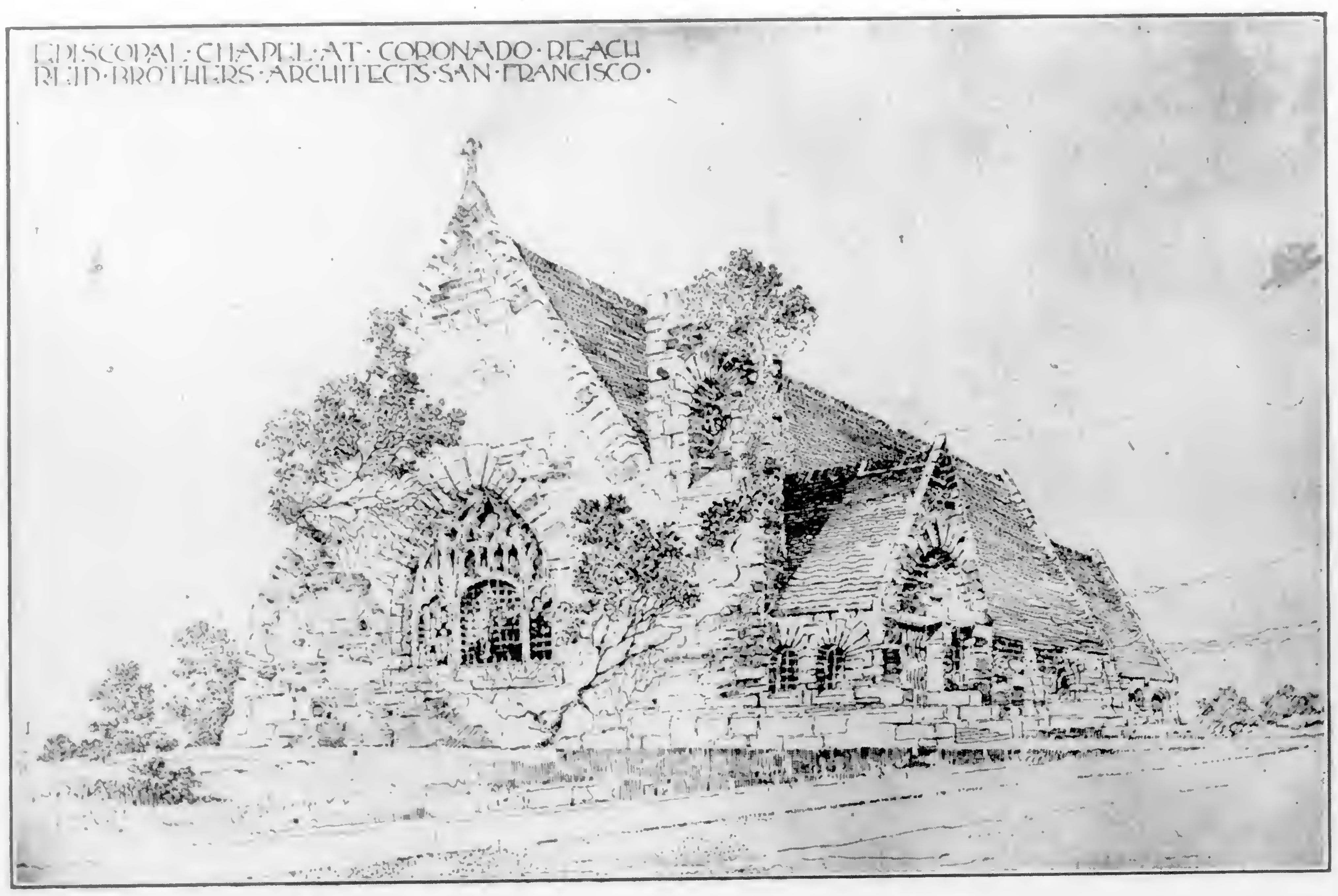
Many of you have seen buildings of concrete blocks which showed bad cracks in the wall. A building of this material requires just as solid a foundation as though built of any other substance, but in nine cases out of ten where I have found cracked buildings I have found this result came from laying the blocks in the wall too green. They must have at least thirty days in which to cure, and they are better if they are sixty days, or even six months old.

Care in Laying

Too great stress cannot be put upon this important part of the business. A mortar of equal parts of lime and cement to two or three parts of sand should be used, and all blocks carefully bedded and butted on the ends and the joints well pointed up. This pointing should be done at the time of the laying, as if done at some later period the blocks are apt to absorb the moisture from the mortar, thereby loosening it, so that it will drop out.

Some blocks are provided with small oval openings at the ends for the reception of a soft cement mortar. After a course of this style of blocks has been laid in a wall the mason should go along the wall with a measure of mortar, sufficiently plastic to pour into these oval openings. This not only insures a tight joint but acts as a dowel to tie the wall.

I have seen many jobs completed which were very unsightly on account of the carelessness of the mason in allowing the blocks to become spattered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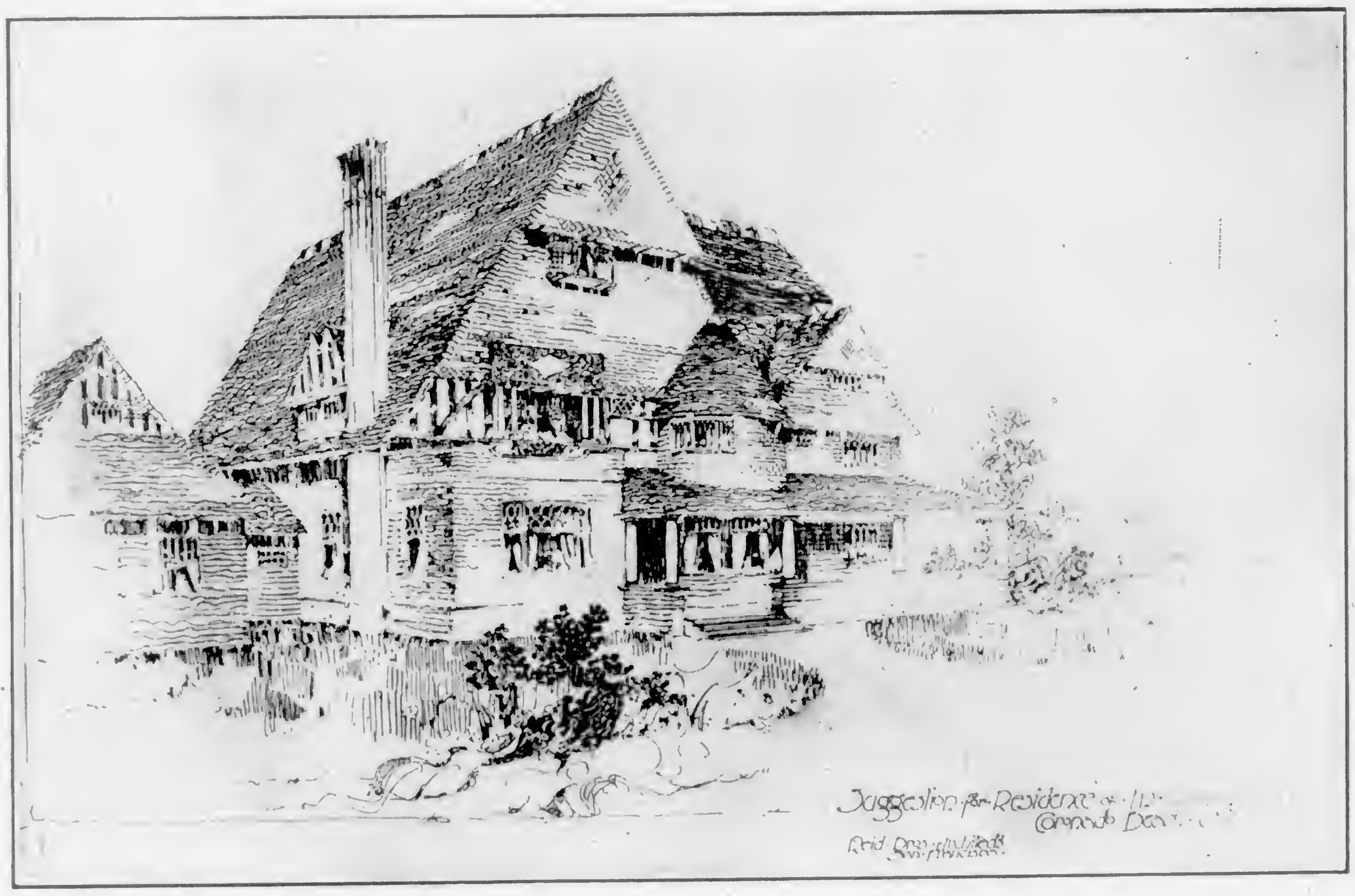

Suggestion for Residence of Mr
Coronado Beach
Reid Bros. Architects
San Francisco.

C-329

with the mortar. This can easily be avoided, and I have found it in most cases comes from masons who are prejudiced against the use of concrete blocks.

These subjects will be more carefully discussed in the report of the committee upon Standard Specifications for Concrete blocks, which was appointed by the Cement Block Machine Manufacturers, as above referred to.

Summing up, we find that we have arrived at a very vital and important point in the progress and development of this business—we have arrived at the "Parting of the Ways."

There will be two distinct classes of this material, viz, good and bad—the latter coming from those lacking experience and knowledge of the business; and let us use our united efforts to set them right.

If you have a new competitor in your town go to him and tell him how to make good work, and it will invariably assist in bringing about a uniform and superior quality of concrete blocks.

There will always be some failures, as there are failures in any business, but by united effort and care we can reduce these failures to a minimum and early establish this material in the high class to which it belongs, and our troubles will be reduced to a minimum.

Sketch for an Alta Piedmont Residence *C. W. McCall, Architect* C-330

Reinforced Concrete Tests at the University of California

By CHARLES DERLETH, JR., C. E. Associate Professor Structural Engineering

THROUGHOUT the United States and Europe, during the past decade, the use of concrete as a structural material has been steadily increasing.

Much of this advancement is due to the improvements in the manufacture of Portland cement, and the growth of plants which manufacture that material. Much of the surprising development of concrete structures is due also to the inherent advantages and adaptabiliy of the material.

The combination of concrete with steel produces for certain purposes a material of still further advantages and favor, and it may properly be observed that at the present time, the use of reinforced concrete is becoming so general that it may be considered almost a fad; everybody wishes to use it, whether it be adaptable or not, and sometimes even where it is not so economic as structural steel.

In California during the past few years, reinforced concrete buildings and reinforced concrete arched bridges have been steadily increasing in numbers. Bridges of this type of construction are to be found in many different localities of the State and reinforced buildings, especially in the vicinity of San Francisco and in Southern California are becoming so common that they are no longer a novelty. Los Angeles in particular is favoring to the extreme this method of construction for buildings, and at present some structures of decidedly bold proportions are being built in that city.

The demand for cement in California is now unprecedented and local manufacturers find difficulty in supplying the market. Few tests of concrete and reinforced concrete construction embodying modern reinforcement and fire-proofing principles have been made in this State, and practically none upon large sized members in which local cement has been used. There seems to be much need for tests which will throw light upon the merits of reinforced concrete, using local cements. To fill this need the Civil Engineering Department of the State University has arranged to make the investigations. It is a further significant fact that a number of Engineers and contractors in San Francisco and elsewhere have agreed to assist in the tests and studies. These outside interests are to furnish materials, labor or money for the prosecution of the work upon a respectably large scale.

A special building has just been built upon the Campus, at Berkeley, for housing materials, making test specimens and storing them. All types of deformed bars will be used and also plain bars. The tests will be arranged as far as possible in such a manner and of such proportions of test pieces as to give comparable results that may clearly show the relative merits of different materials and types of design. At least one brand of German cement and one of the Eastern standards will be used besides the Pacific Coast brands which find a market in California. It is intended to use concrete made with German and Eastern states' Portland, merely to give as far as possible, means of comparison with tests made at other places in order to throw light upon the merits of California cement as compared to other brands.

The first tests will be the usual ones for the examination of the individual materials, sand, stone, cement and steel, to determine definitely their mechanical and chemical properties. Adhesion tests, concrete to steel, will be carefully studied.

Of large sized pieces the first will be beams of proportions such as are found in the floors of heavy buildings. It has been decided to test spans of 16 and 20 feet. These studies will be followed by others of slabs and columns. The programme of work may, however, be changed much from the above brief outline as the work progresses.

The Department of Civil Engineering will be greatly indebted if persons, interested in the subject, will offer suggestions or criticisms or help, as the work proceeds. Communications and assistance of any kind will be very welcome and correspondence with the writer is invited and will be appreciated.

The President of the University issued a statement relating to these tests, and that statement is given below:

"Some very important experiments are about to be made by the Department of Civil Engineering of the University of California. Concrete steel construction has become a very important factor in structural engineering work. On the Pacific Coast much of this work is being done. In the past three years a number of reinforced concrete bridges have been built in various localities in California. Reinforced concrete buildings are numerous, especially in San Francisco and Los Angeles. In the latter city, of late, a number of very large buildings are being constructed of concrete-steel of proportions hitherto untried. The Department of Civil Engineering proposes to make a series of strength tests of the various materials used in this style of construction under the direction of Professor Frank Soule and Associate Professor of Structural Engineering, C. Derleth Jr. The demand for cement in California is now unprecedented and local manufacturers find difficulty in supplying the market. These tests of California cements in reinforced concrete-steel work will be the first that have been made in the State and will enable Engineers and Contractors to better appreciate home products in comparison to those of the East and Europe. The proposed tests will supply a real need and the Department of Civil Engineering of the University of California has, during the past year, received many requests for information relating to this very important structural problem. A number of manufacturers and contractors of the State have signified their willingness to furnish to the University free materials and labor for the purpose of making the tests. The Department will treat the subject in a thoroughly scientific manner. It therefore invites anyone to furnish material and labor, or money, or suggestions, to the department. The results will be in all probability published as a Department bulletin and distributed to the citizens of the state for their information. Any one desiring to co-operate with the Department should address Professor C. Derleth, Jr., Associate Professor of Structural Engineering, University of California, Berkeley."

* * *

The Spirit of Art

Nothing so reveals the true life of a people or an epoch as its art. Neither history nor religion offers such a sure test of the heights to which the spirit of an age has risen. View it as you will, art is molded by the forces that environ it, revealing on the one hand the art and soul of its creator, and on the other hand the heart and soul of his age. However much an artist may think himself detached from his surroundings, however passionately he may turn to other ages for inspiration—nay, even though he feels himself gifted with prophetic prescience, and can project himself into ages yet unborn—still he can no more throw aside the mantle of his environment than he can escape the intangible, viewless air which gives him breath and life.—Edwin Wiley.

Cement and Building Construction

By C. A. P. TURNER, M. Am. Soc. C. E.

THE members of the Cement Users Association may with reason congratulate the American Portland Cement Manufacturers on the uniformity and reliability of their product. They have reached this degree of perfection in their cement only by careful study of methods and materials used, combined with systematic tests of the resulting product.

The cement user may well profit by their example and study his methods in the use of cement if he is to produce results at all in keeping with the high grade and possibilities of the material he is using.

In foundation work Portland Concrete is largely replacing footing stones, giving a continuous monolithic construction which where the ground is soft, may be readily and cheaply reinforced with rods and where the conditions are still more unfavorable and piling is used, a concrete cap reinforced has evident advantages over timber.

In placing the material it may not be amiss to suggest to those who expect results without attention and care on their part, that failure to properly mix the materials and depositing the concrete haphazard without consolidating it by tamping and puddling, or allowing mud and sand to flow around the several shovel-fulls or barrel-fulls deposited, will quite likely result in a footing of little more value than one the writer was forced to remove from under a reinforced column carrying five stories. The contractor, who appeared careless to a reckless extent and thoroughly incompetent, rather than dishonest to this extent, stoutly asserted that the mixture was according to specifications and the pier according to plans. When clamps were put on the column and the footing removed, bad cement was the excuse. The idea that bad workmanship and the lack of cement had anything to do with it, seems not to have occurred to him, although in removing the material, a pick could be driven into it half the length of the blade and streaks of sand and clay unmixed with cement could be found in nearly every example.

In exterior walls of concrete, many depend for finish on a plaster coat after the work has hardened up. Wetting the walls thoroughly sometimes enables a sound coat to be applied, though often there is scaling and chipping when the work dries too rapidly. Removal of the forms early, rubbing down all inequalities before the work has hardened and as soon as it has sufficiently set to stand without forms, will obviate this difficulty.

As a cheaper form of construction, cement brick and concrete blocks are coming into use. The general prejudice against this type of construction amongst architects, can readily be accounted for. Too many block manufacturers believe in mixing their concrete 1 cement to 7 or 8 gravel and selling it for a 1 to 3 mixture. Then again through the unfortunate fad of imitating rock faced stone, our concrete block friends must be credited with the production of the most monotonous building material ever placed on the market.

Too little attention seems to be given to artistic effects that should readily be obtained in the manufacture of blocks at a comparatively insignificant increase in cost. The practice of facing with a selected material such as fine white sand or crushed marble or granite with a rich mixture of cement seems to have been done only to a very limited extent, while as a matter of fact, it is practical and comparatively inexpensive. By casting the faces downward, the facing may be made thin and quite dry and the backing wet enough so that it will supply the necessary moisture to properly crystallize and harden the dryer facing. The object of making the facing dry is, of course, so that it can be removed from the mold without sticking to it and destroying the finished surface, which would be the result using a wet or moist mixture. By a dry mixture, the writer does not refer to one which is mixed without water, but to one that is not sufficiently wet or rather moist, to stick to the plates of the machine when tamped.

The writer's observation of the manufacture of cement brick, is that by the use of a dry facing of fine white sand mixed in the proportion of 1 cement to 2 sand averaging a quarter of an inch thick, backed by a mixture of 1 cement to 4 coarse sharp sand made wet enough to stick together when a sample is placed between the thumb and finger, that very satisfactory results were obtained and with no trouble in curing. On the other hand, such a mixture would force the workmen to wipe the division plates of the machine every second or third batch and they were too much inclined to save themselves this trouble, by using a dryer mixture which could be cured, if at all, only with difficulty and repeated wetting. The difference in the amount of moisture in the two cases is slight, but the difference in the product at the end of twelve hours is very marked. At the end of that period, the brick made with a moist backing would set so that the corner would have an edge sharp enough to cut the skin of the finger if rubbed along it and if the brick were thrown against a hard block it would break in fragments like a burned brick. On the other hand, in one made with the dry backing, the corner could be readily sanded out and if the brick were treated as the other, there would be nothing but sand left of it.

It may be imagined by some that there would be a plane of cleavage between the rich facing and the leaner backing, but in no case has the writer been able to break the facing away from the backing, cleavage occurring in all cases either one side or the other of this plane.

The cement brick the writer has had experience with, unless of considerable age, do not stand shipment well. Better methods of curing will undoubtedly remedy this and seem equally applicable to the block business. A warm, damp atmosphere is most conducive to the hardening of concrete and it would seem that a curing chamber in which the blocks and bricks could be placed and subjected to an atmosphere of exhaust steam, would be an ideal arrangement. To properly realize the possibilities in this line of work, evidently requires honest and thorough work combined with a careful study of methods and results and when this is fully realized by those engaged in this line, we may expect the architect will be ready to favor the material which you have demonstrated, to be strictly high grade. This demonstration, however, must come from the manufacturer, as he cannot consistently expect the architect to specify something which might be satisfactory if the work was well executed, with the chances against this being realized.

In interior construction the advantage of concrete properly reinforced, over timber or steel, lies in its permanence, the perfect protection of the steel against corrosion or destruction by fire and last, but by no means least, to the peace of mind of the builder. The avoidance of complicated shop details and the opportunity for the annoying little errors and endless delays incident to structural iron work.

In treating the subject from the popular standpoint, the writer would say a few words as to the reliability of the construction as compared with steel or timber. Ignorant abuse will render dangerous the best material the engineer uses,—for example, some months ago the writer was called upon to inspect some coupler pockets forged out of 1¼-inch by 4-inch bars. They were worthless, the writer was told, and going to the pile and selecting four, they were placed on the ground and struck a few sharp blows with the sledge. A single blow fractured 10 square inches of metal in two cases. In normal condition this area would carry 600,000 pounds intension. Taking the shank to a steam hammer, the center was bent flat on itself without fracture, proving that the smith had burned the steel in forging until it was worthless at the bend.

Similar inexcusable ignorance in working concrete, will likewise result in inferior work, but by no means to such an extent as that instance in the case of the steel.

While the use of reinforced concrete is older than steel construction, it is only the low price of Portland Cement that has brought it rapidly to the front. During the time that cement was expensive, it was naturally used sparingly and it is a fact that this custom has had an unfortunate influence in the introduction of reinforced concrete. The use of too weak a mixture and the consequent failure to secure the requisite adhesion of the steel to develop the limited strength of this concrete has brought out a number of deformed bars, the advocate of each claiming special merits.

As the writer has secured, as far as he is aware, greater strength in actual construction with special arrangements of plain bars, than anything claimed by the advocates of special bars, he is inclined to regard the advantages claimed for them as a somewhat definite quantity. In designing the reinforcement of beams and slabs, advantage should be taken of the principles of continuity, since with constant section we have to provide only for two-thirds of the moment of a simple beam and we have but one-fifth of the deflection. Further, by properly lapping the rods we may double the section over the support and require theoretically but half the metal necessary for a simple beam the same strength. This system of design calls for the major section of metal for the flange reinforçement over the support and furnishes ample provision for shear.

In constructing work in this line, it is well to bear in mind that centering is a considerable item and that each additional beam is an extra expense. This fact led the writer to use larger and larger slabs and finally to advocate construction of floors with column spacing 16 to 18 feet centers with no beams whatever, but simply a plain slab and columns. In this connection a few remarks regarding the theory of reinforced concrete, may not be amiss. The theory based upon the elastic proportions of the dual materials, has been derived from experiments on beams and slabs reinforced in one direction and agrees fairly well with the results of tests of work involving the conditions considered in this theory. The conditions resulting from reinforcement in a number of directions are, however, not properly considered in any work that the writer is familiar with. Mr. Chas. F. Marsh makes this statement in his work on reinforced concrete Part S, "Unfortunately it cannot be said that we have a thorough knowledge of the properties of reinforced concrete. It may be that we are wrong from the commencement in attempting to treat it after the manner of structural iron work and that although the proper allowances for the elastic properties of the dual material is an advancement on the empirical formulae at first employed and used by many constructors at the present time, yet we may be entirely wrong in our method of treatment. The molecular theory, that is, the prevention of molecular deformation by supplying resistances of the reverse kind to the stresses on small particles, may prove to be the true method of treatment for a composite material like concrete metal. This theory is the basis of the Cottancin construction which certainly produces good results and very light structures, and in Considere's latest researches on hooped concrete are somewhat on these lines." As the writer has been able to place a test load on slabs equal to two or two and a half times their figured ultimate strength by the formulae presented in Mr. Marsh's treatise, without injuring the construction nor apparently developing more than a third its ultimate strength, he is inclined to agree with Mr. Marsh and is in the habit of designing those slabs and guaranteeing them not on the basis of text book theories, but by the known relation of the new slab to the slabs tested as regards the depths and the moment of the super-imposed load.

As regards the materials for our aggregate, as a matter of economy we use either crushed stone and sand or sand and screened gravel or where the natural gravel is suitable, the gravel without screening. In crushed stone, the harder the stone, the stronger our concrete. For reinforced work we use a mixture of about equal parts of sand and crushed stone ranging in size from a pea to 5/8 or 3/4 inch diameter and about 1¼ barrels to 1½ barrels of cement to the cubic yard of concrete. For columns we find it cheaper to secure the compressive strength by the use of a rich mixture from two barrels up to two and a half barrels per cubic yard. We can depend on such concrete showing a crushing strength in cubes upwards of 6,000 pounds per square inch and can readily keep the size of our columns to reasonable dimensions with ample strength. The system of reinforcement that we use, consists of a fair percentage of vertical reinforcements used for columns with riveted hoops at intervals of the length. Where we do not employ beams, we bend the vertical reinforcement outward, making an enlarged cantilever top to the column, which is buried in the slab and supports the slab reinforcement and we reinforce the slab in four directions. Where we employ beams, we prefer to break the floor up into panels rectangular and if convenient, approximately square and reinforce our slabs in two or more directions. If we are using gravel for the aggregate, we sample this carefully and vary the amount of cement, dependent upon the character of the material. If the gravel contains some clay and considerable finer material, we use a larger percentage of cement, endeavoring to get practically the same results regardless of the composition of the aggregate. Many have the idea that crushed stone has some peculiar advantage over shingle or the round stones that we find in our gravel. The results of a series of quite comprehensive tests made at Duluth by the Great Northern Power Co., were kindly furnished the writer by Mr. D. A. Reed, their Assistant Chief Engineer. The mixture as I recollect, was practically a 1—3—5. The aggregate was crushed shale rock first, second, crushed Duluth granite and third, Lake gravel. My recollection of the percentages of these tests is that the crushed granite, which is practically a hard trap rock, only showed a little over 90 per cent of the crushing strength of the gravel concrete, and that all the results seemed very satisfactory, running from 3200 to over 4000 pounds per square inch.

In mixing the material, enough water should be used for reinforced work so that the mixture should have the consistency of brick mortar and flow slowly to fill the molds. No tamping should be required, but even with this mixture a certain amount of puddling and jarring, or shaking the reinforced rods, is desirable if the best results are to be secured. Where practicable, as much of the work should be run in at the same time as possible, since a beam or slab which is spliced will show much less stiffness than one which is cast at one time, a condition which can be readily accounted for by the shrinkage strains in the concrete.

A question which is quite frequently raised and concerning which many architects seem to be worried, is whether reinforced concrete can be successfully executed in winter. In engaging in this line of business, the writer will say frankly that this question gave him some little concern. His previous experience in building bridge piers when the temperature was at times 25 or 30 degrees below zero, caused him to consider it practicable to execute reinforced concrete work in the winter and we are now carrying it on every day just as we would in summer, except for the slight inconvenience that we have to keep the snow and ice out of our forms until we can fill them with concrete and are obliged to heat the material that we use. When this is properly done, freezing does not appear to damage the work as much as too rapid drying in the hot summer months.

We have here a number of views of work that we have executed, some showing test loads that have been applied. We have put up nearly all kinds of structures,—office buildings, machine shops, warehouses and paper mills and the writer has recently designed reinforced concrete floors for a large power station in which there are to be three of the largest vertical generators that have been built, having a capacity of 7500 Kw. with 25 per cent overload. These are to run at the rate of about 380 revolutions a minute and are to be supported on a reinforced concrete slab of about 21 feet in span.

* * *

Cement Block Architecture

By LOUIS H. GIBSON, Architect, Indianapolis, Indiana

I COULD never have hesitated long in accepting the cement-block idea. I have hesitated long, however, in agreeing to accept cement blocks as at present manufactured. I have recognized the inherent merits of concrete construction, and from the beginning have felt that making concrete in block form was a worthy building and-commercial enterprise, but as one interested in architectural work the actual results of concrete manufacture have been such that, until recently, I have felt that I could not afford to encourage and foster this industry. I am doing it now in this way, not because of any decided encouragement through specific results, but on account of what I recognize as a possibility. I know that a worthy cement block can be made commercially. My conviction rests upon the well-known and well-recognized merits of concrete as a building material and because it is desirable to fabricate it into block form. It is difficult to form concrete along proper architectural lines into structural and decorative shapes, such as monolithic walls, columns and lintels. The construction of forms of wood or other material for monolithic structures above gravel is very expensive, not readily practical and by no means satisfactory for structural and decorative purposes. The block machine is the logical form of concrete for building purposes. Through its agency any shape or form may be made. Concrete will come into structural and decorative use largely through the agency of the machine.

Our highest and best thoughts may be given permanent and adequate expression through the medium of the machine and the concrete. But I have never seen an artistically successful structure executed with cement blocks. I am pinning my faith in concrete blocks to what I know can be done, and as not resting upon what I have seen done in a commercial way in a completed structure. I have not seen one worthy artistic expression through this medium. Think of it as you may, regard these expressions as sentimental if you will, say that it is all fol-de-rol, if you feel that way, but bear in mind that the cement block industry will rise or fall, you will make money or you will lose it, according as you meet the canons of artistic sentiment. Through the medium of cement blocks you must be able to do what has been done with other building material—give expression to the manifold capacities of the human intellect, with all of its hopes, ambitions and emotional flights—give them permanent form in structural material. Few of you will go into business for art's sake, yet for the dollar's sake you must produce the medium of artistic expression. This you have not done.

There are times when it pays to blurt out the whole truth. This is such a time, and this is the truth. Architects are unfriendly to the concrete block as now made. Is this because the architect is unfriendly to concrete? I answer this question by asking another. Who has been more ready to use concrete as a structural medium than the architect? The architect wants to use the cement block. He is always looking for a new medium. The architect will tell you that when you realize the possibilities of this material he is ready to use it.

The most successful terra-cotta concern in the world makes the most artistic forms. They carry out the designs of the architect most faithfully. The most prosperous pressed brick makers in America make the most artistic brick. They have certain stock patterns, well designed, which a self-respecting architect is not ashamed to use. They will make what he wants, but if he hasn't time to wait for the new designs there are often those in stock which he does not hesitate to employ. The architect uses stone, terra cotta, brick, and he uses them in block form. He is not using concrete in this form. This is the fault of the block maker, and not of the architect. As now made, he is afraid of it structurally and decoratively, and doubtful of the general capacity of the manufacturer to carry out his plans.

There are those among us who will say that the block maker is not ambitious to furnish material for the great cathedral, the tall office building, the impressive public structure or the modern palace; that he is willing to let this work go to the quarrymen, the stone cutter or the clay-worker. If the concrete block is not for these important buildings it is not for the cottage, the store or the factory. There is no relative difference in the structural or ideal of these problems. The $1,500 house is deserving of the same quality of attention, the same care, as the important structure.

The block situation is rather unique. Oftentimes in placing a relatively new product before the people one has to bring the people up to his ideals. The public is demanding a structurally better product, a more highly developed substance artistically than you are giving them. The opportunity is a rare one. It is for you to educate yourselves to meet the public standard. A greater opportunity never presented itself to a lot of business men.

Do not imagine for a minute that art needs help from you. It is you who need the help of art, and the foundation of your art is utility. You are not to be patrons of the arts for art's sake. You are patrons of art for your own sake, for your pocketbook's sake. You need art, art does not need you.

It is our aesthetic demands which give great value to raw material. The modern alchemists are the artists, the scientists, the engineer—men who have ideals and give them practical expression. The modern alchemist mixes the sand, the cement, gives it form and turns it into gold. This is the key to the cement-block situation to-day.

The modern alchemist who would turn sand and cement into gold must first learn how to make concrete. Block makers and cement workers generally are lamentably ignorant in this fundamental operation. The impression has gotten out that a laborer who is not fit for anything else can mix concrete; that the cheapest labor that one can employ is good enough to do this work.

This part of the world is well saturated with this idea. The question of brains and the concrete mixer is rarely considered. Almost the only difficulty in the physical composition of cement blocks is in the making of concrete. With this understood and appreciated and thoroughly ingrained into the cement worker, his physical difficulties are well out of the way. The block maker, strange as it may appear, is the most difficult of all men to interest in the mixing of concrete. The architect who talks to the block maker is apt to meet a dull ear on this question. His auditor thinks that it is the other fellow. He will acknowledge that the rest of the regiment is out of step on concrete mixing, but that he is the one man who is in step.

Before we get through with our block business we are going to grade our sand, we are going to know that the voids are reduced to a minimum before the cement is introduced, and we will thoroughly mix the sand and the cement in the dry before the water is applied. Most cement workers believe that they are already doing this. Their wrong belief is the source of the physical trouble. It is the cock-sureness of nearly all that is the real stumbling block. Block makers particularly have been educated by the machine salesman that any old thing can mix concrete. When we learn to mix concrete we can hope to make the impervious block. Cement makers, as a class, have done their work well and scientifically. They have availed themselves of all of the resources of science, and it appears absurd that this work should have stopped with the making of the cement. The chemist, the engineer and the cement maker have joined hands in the mixing of concrete. In the making of blocks they have parted company. We have been floundering around, doping our blocks or letting the rain pour through them merely because we have not given the right kind of attention to a primary step in block making.

We may take lessons from the modern mechanical mortar maker in the mixing of the aggregate in concrete. He dries his sand and mixes it mechanically. The makers of bitulithic pavement have reduced the grading process to a science, and on that account are reaching a large measure of success. We may study a modern asphalt plant with profit.

Sand must be clean. Most cement blocks that I know anything about are made of dirty sand. All of them were of a muddy tone. If one would make a clear, crisp, life-colored block he must use clean, crisp, sharp, live sand. Barnyard mixtures make barnyard colors. Most of the blocks that we see are dull, heavy, lifeless and leaden in color and texture. This can be obviated by clean sand and a proper proportion of cement of the right kind. The oolitic stone that we use in our best buildings is almost absolutely pure in its ingredients. As we ride through the country and see the cement block buildings, with their dull, leaden color, we may trace it to dirty sand. We may do whatever we please with cement mixtures with respect to color and texture. We may make a white block, if we will, but we must use white sand and white cement and must handle it with clean hands and clean tools.

We will mix our aggregate with more water than has been common with most of us. We will experience troubles from crazing, hair-cracking, if we do not take advantage of our opportunities. The cause of this trouble from cracking suggests its own remedy. It is the relatively neat cement on the outside of the block, the difference between the composition of the surface of the block and the interior—a difference in contraction. If our blocks are of the right composition we may wash them and we may cover them with damp cloths while they are setting. We may rake them over with a fine-toothed tool. We may give them a texture with a white wire brush. The man of resource, keen perception and artistic insight will find many ways of getting around this difficulty.

The principle involving the production of proper texture is not difficult to understand when we analyze it. We want cement enough, certainly not too much. We know that we want it evenly distributed. The nearer we can come to exposing the sand on the surface, the nearer we can come to having the view side of the sand, the side that we see, free from cement, the better. Those of us who can remember the lost art of old-fashioned, hard-finished wall plaster know what this means. With a brush and water the plasterer washed out all superfluous lime, and up to a certain point the more lime he washed out the harder and stronger, brighter and crisper he got his plastering. This principle may be applied to the surfacing of cement blocks. In one way or another we shall wash out the neat cement. Unless the proportion of sand and cement be uniform, the texture will not be uniform. The best brick that are now made for decorative purposes, for facing, are not intensely smooth. They have a grain—a texture, we call it. The surface is gritty. It has somewhat of a sandpaper quality. It receives the light in a pleasing way. This is what we mean when we say that a surface of stone or brick has good texture.

I have merely hinted at the possibilities of color work in concrete. We have not yet reached the stage where it would be very profitable to go into this. When we know how to mix sand and use clean materials and mix the cement and water with it, when we know how to handle our blocks, when we know texture and uniformity, then may we consider color. It is sufficient to say that the liveliest imagination of the Arabian and the ~~people of the~~ Orient may find permanent record and adequate expression in the color, texture and substance of the cement block. We will have to get out of the backyard and shed stage of this industry, however, before we can take up cement polychrome.

The immediate task before ~~us~~ is to do the best with what we have, with the men and the brains that we have, with the sand and the cement that we have. The cement is adequate to our capacities for some time to come. We can afford to disturb ourselves a whole lot less about cement and a whole lot more about sand.

An influential cause for the feeling which architects have for the cement block is the difficulty of having their plan exactly carried out. There is too much cut-and-try business. The architect or the builder is not going to submit to compromises in one material that he does not have to submit to in others. In terra cotta, stone and brick all plans can be carried out to a nicety, and there are no advantages otherwise in the concrete block which will lead to a compromise in its favor. The setting plans of a stone cutter and a terra-cotta worker are marvels of neatness, exactness and accuracy. Great buildings are built practically without the sound of the hammer. Certainly the work is fitted before it leaves the cutting shop or the factory. There is no reason why this should not be done in the same way by the block maker. It must be done or the block business will not succeed. I recently had an experience with a block maker who made a setting plan on a shingle and then lost the shingle.

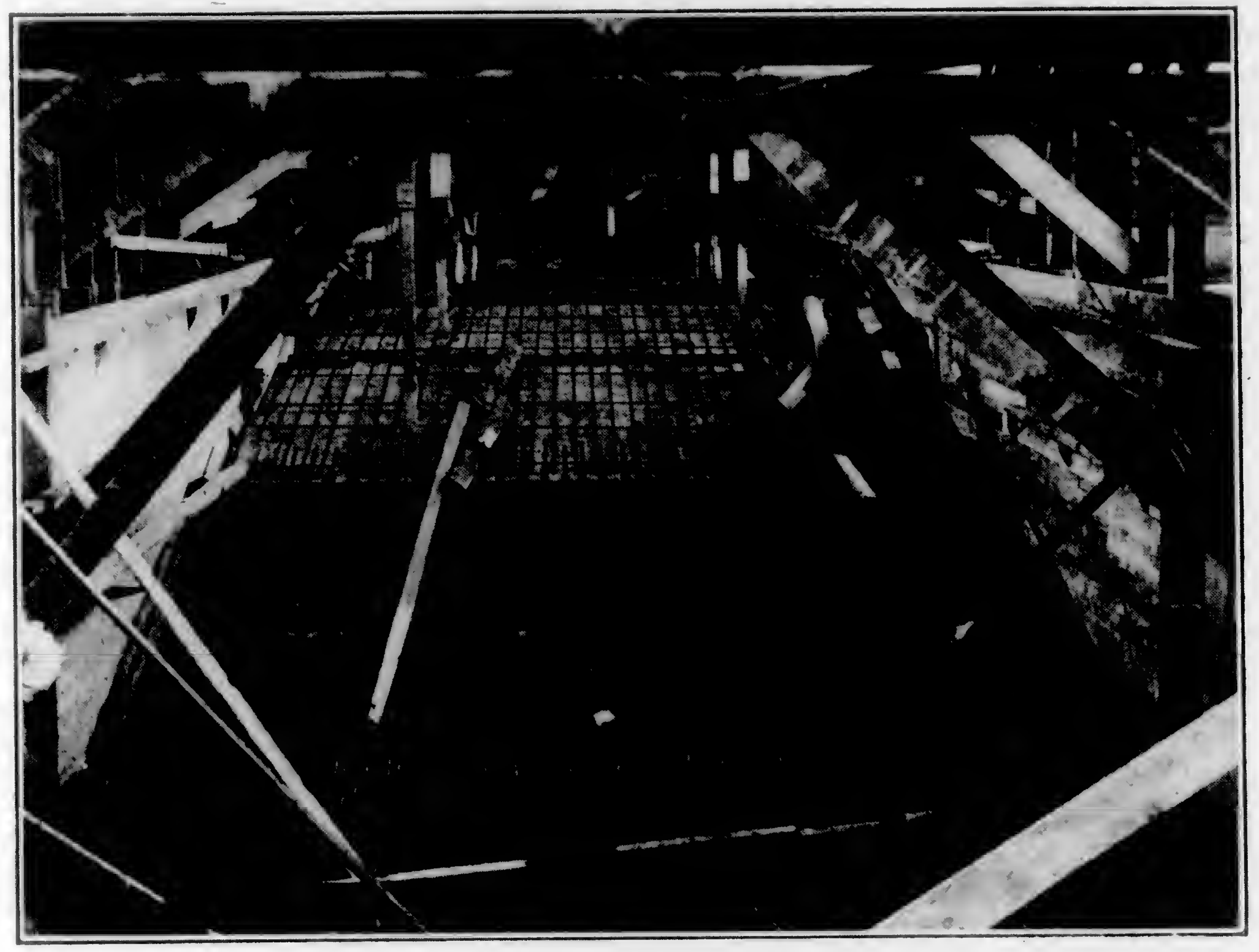
Mechanically the cement-block industry is in good shape. The work has been fostered and promoted very largely by machine makers. However, the industry has been injured by the machine salesman, who has minimized and at times concealed the difficulties in the way of making a commercial block. So far as the block itself is concerned, the machine is the least important factor in its manufacture. A cement block can be made in a wooden box. Any machine will make a block that is commercially satisfactory if the material is at hand to put into it, providing there is an opportunity for proper tamping or compression. The important part which the machine plays in this industry is in reducing the cost of the block. This work has been well done and little need be said about it here. It is well for the block maker to understand, however, that he must be able to so adjust his machine that a block of any size in any direction within fractions of an inch can be readily made on a commercial basis. The builder, the house owner, the investor can get what he wants in other materials, and he will not put up with compromises in the block.

The laying out of the work in the shop and the preparation of careful shop drawings will very largely eliminate the evil of indifferent handicraft. bad workmanship, and we all know that there is no branch of the building business that has suffered as much at the hands of the botch as the block industry.

Concrete, in its nature, suggests a comparison with stone. Hence the high standard. A part of beauty in a building is color, texture, general design, but after that there comes the question of detail, of the parts, the moldings, the ornament. On the one hand, there is mere construction, mere building, and then there is art. In order to have architecture there must be both building and art. In architecture the two are inseparable. It costs no more money to make a beautiful form than it does an ugly one. I would regard it as an opportunity lost if I did not say here and now in the strongest terms at my command that there is no excuse for an ugly structure of any kind in this world. Be it a building, a bridge, a bit of furniture, a machine or any other object in which material and labor are brought together, there is absolutely no excuse for ugliness on any account. There is no excuse for ugliness on the grounds of cost. Good proportion costs no more than bad proportion, harmony of color costs no more than inharmony; there is no more expense of material or labor in a well-formed molding than in an ugly one. There is no more expense attached to grace than to clumsiness. Beauty is a condition of mind, a condition of heart, of character, and not one of pocketbook. Clumsiness and crudeness come out of a crude and clumsy mind. It takes no more time or material and no more labor to cast a beautifully-formed block than one ugly in form. I do not say that one form may not be more expensive to cast than another, but I do say that there is no excuse for casting an ugly one. Everything made by man might be beautiful without material consideration. There are certain standard forms that can be produced and reproduced as they have been for more than twenty-five hundred years. The repetition has had no effect upon their beauty or appreciation by the public. The forms most commonly in use at this time by architects and artist builders date from the fifteenth and sixteenth centuries. It is from this source that the ornamental brick makers draw most of their inspiration. It will be necessary for you to employ artistic designers who can design for you certain relatively simple standard designs which may be readily adaptable for various purposes. This is eminently a practical thing to do, and it must and will be done if the block business reaches any large measure of commercial success. Hitherto he has been a great sinner in producing the crude and ugly shapes.

The cement-block machine is a great art democrat. It may produce and reproduce artistic forms for the masses. It may give us beautifully decorated structures at a minimum of cost. Art is not for the few any more than education is for the few. Art should be for everybody. Art should be democratic. and the block machine should be a great art democrat. There is an intimate relation between this idea and the bank account of the block maker.

There are those among you who will say that these expressions in regard to the making of concrete, the grading of sand, the cleaning or washing of sand, the fine adjustment of mixtures, the matters related to color, form and art are ideal. Possibly they are ideal. We progress through idealization. The cottage is a man's materialization of a state of mind which seeks something more than to keep out of the wet and cold. But for the idealization, we would not quarry or cut stone. We would not make brick.



Reinforced Concrete Bridge, Pollasky—View Showing Reinforcement C-331

Reinforcement in Pollasky Bridge

THE cut shown on this page is a view of the forms and corrugated steel bars as used in the Pollasky Bridge, a description of which structure, accompanied by typical illustrations, appeared in the last number of this Journal. The bridge as it stands contains about 3,000 yards of concrete in which 90 tons of Johnson's corrugated steel bars were embedded to take up the tensile stresses produced by bending in the rib and to provide the necessary resistance for those portions of the spandrel wall acting as beams.

The corrugated bar here used is particularly well adapted to this class of work in that it is easily handled, it is efficient, and, owing to its high elastic limit, it is economic. The patentees for this bar guarantee an elastic limit of from 50,000 to 60,000 pounds per square inch, and an ultimate tensile resistance of 100,000 pounds per square inch.

The life of the steel in this bridge is indefinitely prolonged by its protection from the air.

The type of bar herein mentioned was used throughout for two other large bridges now in course of construction in California and for one just completed in Nevada, all of which structures were designed by Mr. John B. Leonard, of San Francisco.

* * *

The coat doesn't make the man, but the lawsuit makes the attorney.

* * *

Query: Is the poor man who marries a rich grass widow in clover?

The National Cement Users Convention

By WM. B. GESTER, C. E.

IF ANY feeling has existed, that the wonderful new interest in the use of concrete and manufactured stone, which has grown up in this country during the course of the last three or four years, has in any wise ceased its growth; if any idea has been engendered, that the enthusiasm and confidence of the great numbers of wide-awake men who have recently gone into the business, has in any degree waned; if any belief has been held by ultra-conservative souls, that the movement is temporary, or in the nature of "fad"; such feeling, idea, and belief have received a solar plexus blow in the success of the convention of the National Association of Cement Users, which was held in Milwaukee during the week beginning January 9th, for the meeting was largely attended, the interest and enthusiasm were unabated, much valuable knowledge was disseminated, and finally the incorporation of a National Association of Cement Users was decided upon and the first board of officers elected.

The first paper on trade subjects, was that read immediately after the temporary organization, by Mr. Sanford E. Thomson, consulting engineer, of Newton, Massachusetts, on "Concrete Aggregates." This was followed by an address by Mr. George L. Stanley of Ashtabula, Ohio, on the subject of "Concrete Streets, Sidewalks, and Floors." Incidentally the matter of the use of salt in concrete, made and laid in cold weather, was dwelt upon, and the results of a number of recent valuable experiments given to the convention.

The address of President Richard L. Humphrey of Philadelphia, which was illustrated with excellent stereopticon views, was in the nature of a report of progress and a general resume of the subjects to be touched upon during the convention. Mr. Humphrey's views were of a technical nature and were highly interesting and instructive to the members of the profession.

Stereopticon talks were also given by A. L. Johnson, civil engineer of St. Louis, on the subject of "Steel for Reinforcement," and by Ross F. Tucker, president of the Concrete Association of New York, on "Twenty Years of Experience in Concrete Construction."

At the morning session on Wednesday, January 10th, C. A. P. Turner, civil engineer of Minneapolis, read a paper on "Cement in Building Construction," illustrating it with stereopticon views; following which, President Richard L. Humphrey, consulting engineer, Philadelphia, read an interesting paper telling of investigations of cement mortars and concretes made at St. Louis, also with stereopticon illustrations; R. W. Lesley, a Philadelphia cement manufacturer, clearly defined the relations which should exist between the manufacturer and the user; Charles E. Watson, of Toronto, chairman of the committee on art and architecture, concluded the morning session with a committee report, in which he showed that the use of cement for building purposes had already resulted in a better style of architecture.

At the evening session Louis H. Gibson, of Indianapolis, read an interesting paper on cement block architecture, and was followed by S. M. Woodward, of the United States Department of Agriculture, who showed the many ways in which cement and concrete might profitably be employed upon the farm, taking in many things the place of wood. One of the most generally interesting papers of the session, because it was not necessary to treat it from

C.F. WHITTLESEY
ARCHITECT.
Reinforced Concrete Floor
104625 POUNDS
Deflection at Center ONE QUARTER INCH
C. LEONARDT
CONTRACTOR

Showing Test of Reinforced Concrete in Los Angeles Building C-332

Reinforced Concrete Test

THE following state of a test on reinforced concrete floor in the Hayward Hotel Building, Los Angeles, was prepared by Architect C. F. Whittlesey:

Size of space loaded, 225 square feet.
Thickness of floor, 4 inches.
Size of girders, 10x16 inches.
Size of intermediate beams, 5x15 inches.
Distance between centers of beams, 5 feet 4 inches.
Total load on space, 104,625 pounds, 465 pounds per square foot.
Deflection in center of space of completion of loading, ¼ inches.
Deflection 36 hours after loading, ¼ inches.

Calculated load required to destroy panel, approximately 985 pounds per square foot, and in this loading the floor would not break suddenly, but would deflect probably ⅝ inch, at which point it would begin to show cracks and would fail gradually and give ample warning before breaking.

* *

No woman cares to be a silent partner in a matrimonial firm.

* * *

Don't attempt to belittle others because you feel that they are superior to yourself.

a technical point of view and also because of the action taken by the association in an afternoon, was one on the value of organization, read by I. S. McDonald, of Milwaukee.

"This is a much larger convention," said President R. L. Humphrey, "than we had at Indianapolis. There are more exhibits both of machinery and finished products, more and better papers, and a much larger attendance, over 800 having already registered. It was this evidence of growth which made us consider the matter of incorporating. Our society had grown beyond that size where it could safely be conducted without any further foundation than that given by its constitution and bylaws. I certainly am much pleased that Milwaukee was chosen for this convention."

Among the interesting papers presented to the convention on Thursday, the third day's session, were the committee reports on "Machinery for Cement Users," one on "Concrete Mixers," by E. B. Kelly, of New York, and one on "Pneumatic Tamping and Mechanical Conveying of Concrete Blocks," by J. P. Sherer, of Milwaukee. The latter was a very interesting address, describing the most modern, and undoubtedly the most economical methods of manufacture of the now almost universally used "Hollow Block."

Then followed papers on "Water-proofing," by J. L. Motherhead, of Indianapolis; "The Manufacture and Use of Concrete Piles," by Henry Longcope; "Causes of Failure," by O. U. Miracle; a paper describing the causes leading to the failure of some who have engaged in the concrete block business, which will be presented in its entirety in "Architect and Engineer"; also an address on "The Choice of Cement for Concrete Blocks," by Richard K. Meade, Chemical Engineer, of Nazareth, Penn.

Mr. S. B. Newberry, of Sandusky, Ohio, in his paper upon "The Manufacture of Hollow Concrete Blocks," suggested some improved processes and tests. He denounced the practice of making blocks in imitation of cut stone. Concrete blocks were stone, he said, and if they were to be cut the cutting should be done by hand. The lack of individuality, the monotony of appearance, the fact that block-makers tried to force upon them a certain standard size, were causes which explained the hostility of architects to concrete blocks.

The session on Thursday concluded with a paper by E. S. Larned, of Boston, on the "Testing and Use of Cement."

On Friday the programme included an exhaustive report on "Cement and Concrete Tests," one on "Laws and Ordinances," and one on "Fire-proofing and Insurance." These committee reports served as texts for discussion which was general and very interesting.

Following the reading of the paper of I. S. McDonald, of Milwalkee, on Wednesday, on "The Value of Organization," the matter having been most thoroughly discussed, it was decided to incorporate in the District of Columbia under the national law the "National Association of Cement Users."

Charter and by-lays for the incorporation were ratified by the convention, and the following officers elected:

President—Richard L. Humphrey, Philadelphia.
First Vice-President—Merrill Watson, New York City.
Second Vice-President—J. H. Fellows, Scranton, Pa.
Third Vice-President—O. U. Miracle, Minneapolis.
Fourth Vice-President—A. Monsted, Milwaukee.

A resolution was unanimously adopted, addressed to the speaker of the House of Representatives, imploring Congress to appropriate a large sum of money for the continuance of the important work being done by the United States Geological Survey in the investigation of cement mortars and concretes and other structural material. The memorial states that the association recognizes the importance of this work and emphasized the need of reliable information which will help them in the design of concrete reinforced structures and the use of cement generally.

The association was divided into several districts, each presided over by a chairman, who shall be a vice-president of the association.

One of the most interesting features of the convention was the display of all sorts of machinery for the users of cement and concrete.

Fourth street, in front of the Convention Hall, resembled a section of a State Fair, as a number of concrete mixers with motors or operating engines were stationed there. During the sessions these were in operation and were an attraction for hundreds besides the attending delegates.

Every available foot of floor space within the hall, and more than 12,000 square feet of the main floor of the Frei Gemeinde Hall, one block south on Fourth street, were utilized by the many exhibitors. Brick-making machines, mixers, carriers and every other known machine and tool used in the trade were shown and explained, while many attractive souvenirs were given away to visitors.

The meeting was an unqualified success. It has resulted in a national organization, an incorporation, which will care for the general interests of the trades connected with cement and concrete. It will insure future investigations, scientific and practical tests and the distribution of knowledge of best methods and of all improvements, and cannot but help to further and strengthen the already phenomenal growth of the industry it represents throughout the whole country.

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Has Withstood the Test of Time

Nearly ten years ago; or to be exact, in the Spring of 1896, there was erected at Willow Grove Park, one of Philadelphia's popular resorts, a handsome fountain. The fountain was placed in a large artificial lake, upon which pleasure boats ply. The fountain is an electric device, said to be the finest in America. Below the fountain proper is a room containing electric lights and other apparatus, which is back of the window directly in the center of the fountain. The ceiling of this room is made of boiler plate, and after it was in place it was found that, on account of the haste to get the work done in order to open on a certain day, no provision had been made to form a basin to keep the water from running directly off the plates when it fell from the sprays.

It was desired to construct a basin about a foot deep, over the edge of which the water could flow in a sheet. The engineer decided to use expanded metal, and light iron brackets were bolted to the plates already in position. These brackets were then covered with expanded metal, forming a series of eight semi-circular balconies, which were plastered in Portland cement, a layer of the same material being spread over the iron plates.

The upper portion of the eight piers around the outer wall, and which rise from the water level, was constructed in the same way, at a great saving over the cost of cut stone, and in a very much less time. The whole job was completed in a few days. As stated, the work was done years ago, and up to date has been entirely satisfactory. The fountain is exposed to heat and frost but the cement work remains intact.

Heating, Lighting and Electrical Work

Modern Ventilation

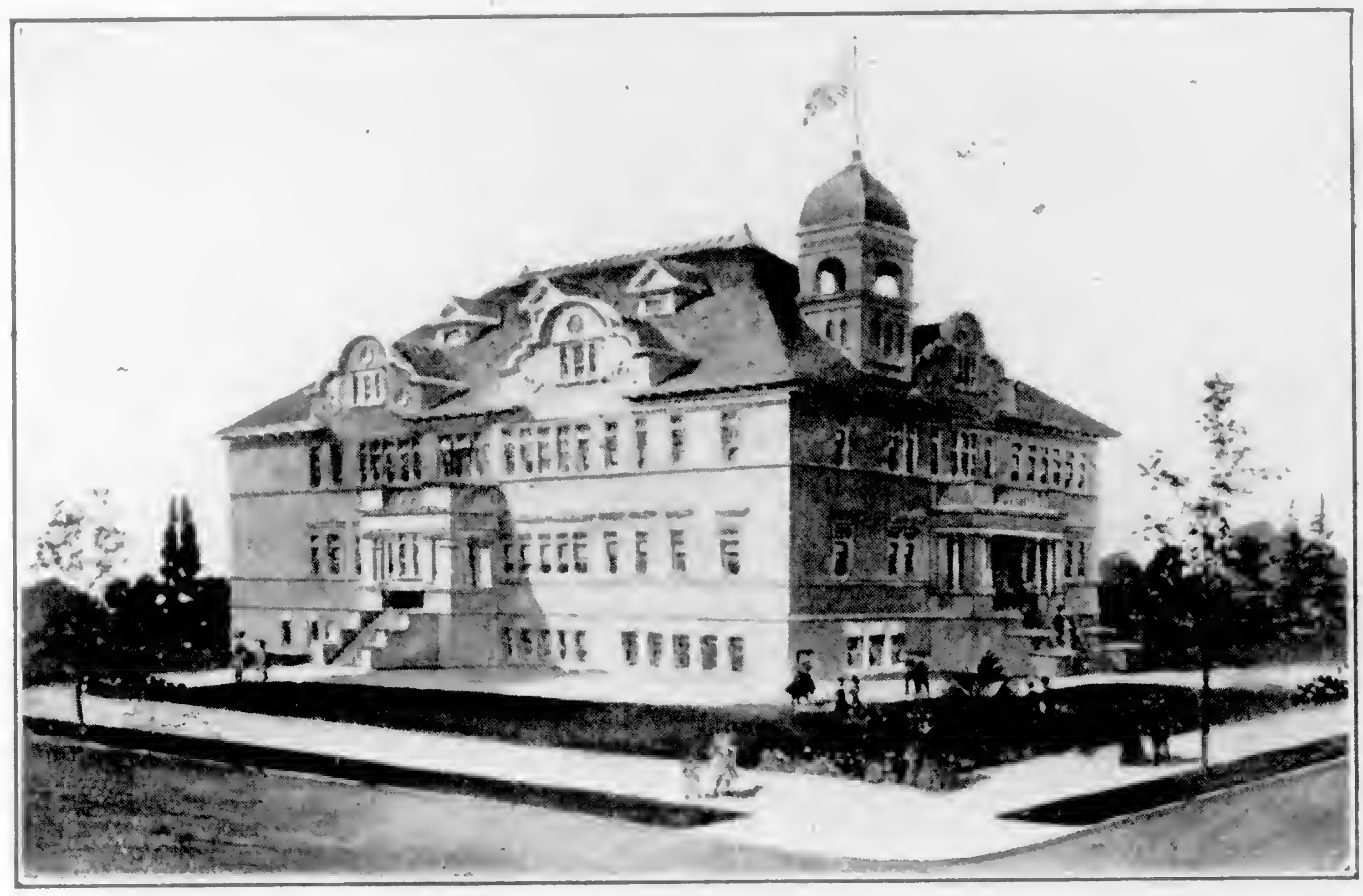
By F. H. BRYANT

UNTIL quite recently ventilation has been generally regarded as a luxury rather than as an absolute necessity. The discomfort of a poorly-ventilated room has been realized with sufficient vividness, but the difficulty of substituting for the debilitating atmosphere one that is pure and invigorating has in many cases been so far beyond the power of ordinary methods to accomplish that a crowded apartment and a vitiated atmosphere have been looked upon as inseparable. But such an atmosphere is more than uncomfortable and disagreeable; it is positively and undeniably injurious, and continued exposure to it is certain to lead to serious consequences.

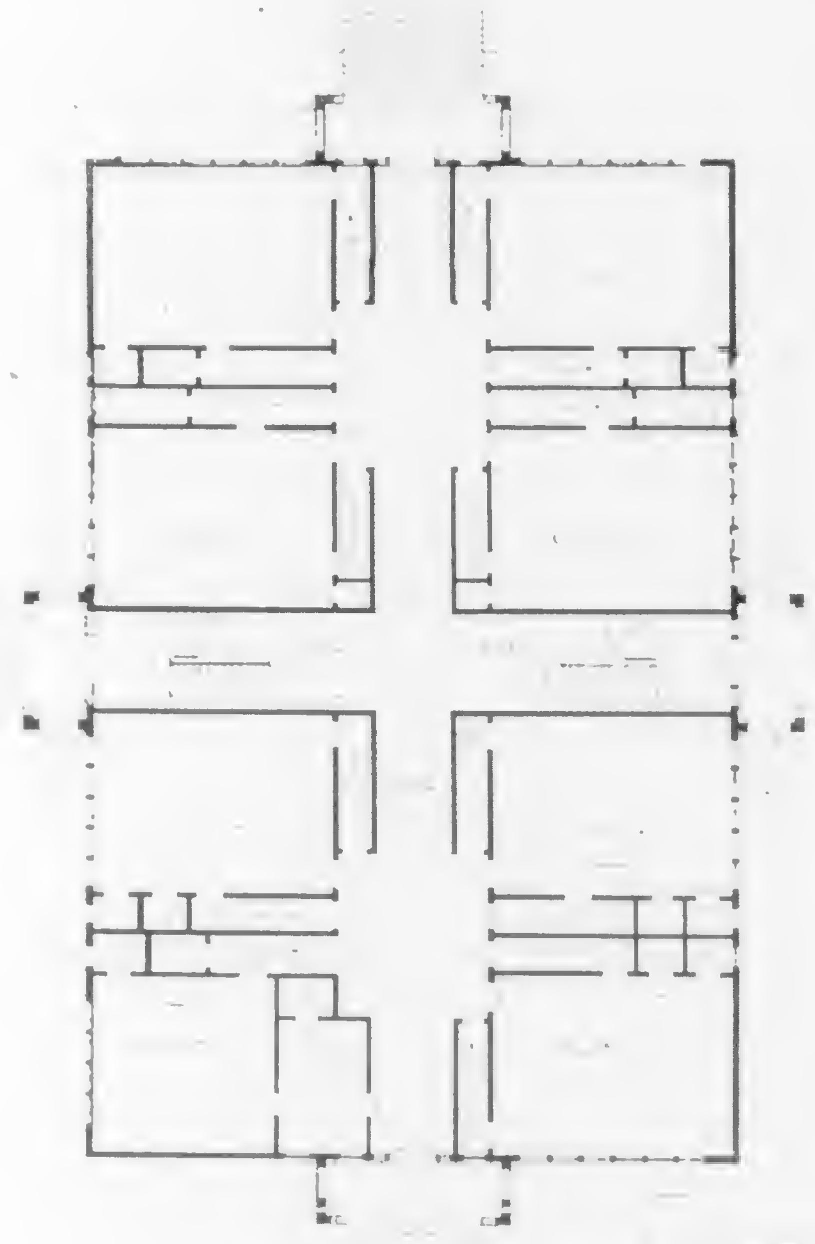
The evil effects of lack of ventilation are made only too evident by such facts as that "death-rates have been reduced by the introduction of efficient ventilating systems, in children's hospitals, from 50 to 5 per cent; in surgical wards of general hospitals, from 44 to 13 per cent; in arm hospitals, from 23 to 6 per cent."

While such figures show directly traceable results of breathing impure air, it is not in these most serious consequences alone that its evil effects are revealed. A vitiated atmosphere lowers the vitality, increases the susceptibility to and severity of disease, and decreases the physical and mental working power of the individual, and, while not producing sudden death, nevertheless inevitably shortens life.

Air. Air being the prime supporter of life, health, and even life itself, are dependent upon the composition of atmosphere. Although simply a mechanical mixture, yet certain gases of which it is composed exist in almost unalterable proportions in the normal atmosphere. Oxygen and nitrogen, the principal constituents, are present in very nearly the proportion of one part oxygen to four parts of nitrogen. Carbonic acid gas, the result of all combustion, either slow or rapid, exists in the very small proportion of three to four parts in ten thousand of air, while the aqueous vapor varies greatly with the temperature and exposure to water. In addition there is generally present in air in variable but exceedingly small quantities ammonia, sulphureted hydrogen, sulphurous acid gas, floating organic and inorganic matter and local impurities.



Long Beach School House *J. Lee Burton Architect* C-333



Floor Plan Long Beach School House C-334

Humidity. The condition of the atmosphere with relation to the amount of vapor or water which it holds in suspension is expressed by the term humidity. Actual Humidity relates to the actual weight of water vapor present in a given unit volume of air, while the term Relative Humidity expresses the relation between the vapor actually present in the air and that which it would contain if saturated. Obviously the air is saturated with moisture when it will hold no more. The actual humidity varies excessively with the temperature; it is, therefore, evident that a statement of the relative humidity gives no indication of the exact amount of vapor present unless the moisture carrying capacity of the air at the given temperature be known.

Carbonic Acid Gas. This gas is of itself only a neutral constituent of the atmosphere, like nitrogen, and, contrary to general impressions, its unassociated presence in moderately large quantities—as in soda-water manufactories—is neither disagreeable nor particularly harmful. But its presence in the air provided for respiration decreases the readiness with which the carbon of the blood unites with the oxygen of the air to form, in the lungs, further amounts of carbonic acid. It is evident, therefore, that when present in sufficient quantity, it may directly bring about not only serious but fatal results. The true evil of a vitiated atmosphere lies in its other constituent gases and in the micro-organisms which are produced in the process of respiration. It is known, however, that these other impurities exist in fixed proportion to the amount of carbonic acid present in an atmosphere vitiated by respiration.

Therefore, as the relative proportion of carbonic acid may be easily determined by experiment, the fixing of a standard limit of the amount in which it may be allowed in ventilated rooms also limits the permissible vitiation of the atmosphere by other impurities.

When carbonic acid is present in excess of 10 parts to 10,000 parts of air, a feeling of weariness and stuffiness, generally accompanied by a headache, will be experienced, while even with 8 parts in 10,000 parts, a room would be considered close. For general considerations of ventilation the limit should be placed at 6 to 7 parts in 10,000, thus allowing an increase of 2 to 3 parts per 10,000 over that present in outdoor air, which may be considered to contain 4 parts in 10,000 under the ordinary conditions of a populous district.

* * *

A Long Beach School House

THE school building shown in this number was built at Long Beach from plans by Architect J. Lee Burton, of Los Angeles. It is considered one of the most up-to-date school buildings in Southern California, containing fourteen class rooms on the first and second floors and two Lloyd rooms in the basement, besides a gymnasium, furnace room, boys and girls' toilet rooms, bicycle rooms, etc.

The Lloyd rooms have Oregon pine floors while the other basement room floors have concrete floors. There is a hot air heating plant, with the fan system to heat all rooms and halls.

The halls are supplied with drinking fountains and standpipes for fire purposes. The exterior of the building is Mission design, with the roof covered with cedar shingles with galvanized iron gutter.

The cost of the building was $36,000.

Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-335

Living Room in Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-335

Terra Cotta and Brick

Bricks Have Made History

By W. E. DENNISON

THE world's events have had no more safe deposit than that afforded by its brick structures. To their ruins in the worn-out countries, whence come our classics, are we indebted for an imperishable record of the ancient peoples of the earth. Bricks have made history. A country without bricks is one whose history is unwritten, a mere myth. The brick-making peoples have been those whose energies were confined to one locality and devoted to the betterment of the race. They have ever been the progressive peoples. None of them were ever slothful in their youth or at maturity, and all have been glorious even in decay.

Man's highest aspirations have ever been to build structures that should emulate the mountains of his Maker not only in grandeur, but also in endurance. What a miserable creature is man in a wooden town! What a here-to-day-and-gone-to-morrow feeling possesses him!

Who does not remember the days of wooden San Francisco and the execrable architecture thereof, whose comfortless remnants still cumber our streets clamoring for the oblivion of a conflagration?

But, happily, we belong to one of the great history-making races and have at last found time to begin the first chapter of our permanent life by making and laying up brick in buildings not to be excelled in any city.

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Fireproof Theatres

By W. I. PARRY, in Fireproof Magazine

THE theatre fire lesson has been taught so often and with such severity and vigor that it is questionable whether it does not take first place in the curriculum of the knowledge bought with bitter experience. Its strenuosity suggests the emphatic method of the old-fashioned schoolmaster who forced his lessons into the heads of his pupils with the helpful aid of the rod or birch, driving home truths that went through the anatomy from end to end and perhaps produced the memorizing effect sought for by reflex action.

Yet, notwithstanding the severe and repeated punishment inflicted for disregarding the most palpable causes of disaster, it seems as if all the teaching has fallen upon barren soil when the constant repetition of errors in construction and the disregarding of attempts at prevention of the fire evil are considered.

After the many sorrowful calamities which the world has experienced, it would seem that in buildings of this character at least the insistence upon fireproof or fire preventive characteristics would be almost the first and last thought of the owners, the architects and particularly of the government authorities. Yet comparatively few consistent efforts have been made to secure this greatly desired result—a result not so difficult to attain if effort, knowledge and experience combined with intelligence and some extra expense are brought into play.

In the first place, buildings of this character should be absolutely required to have streets or wide alleys on at least three sides, so that easy methods of egress could be provided, besides serving to prevent the communication to the theatre of a fire in an adjoining building. With this first great advantage gained, one of the most serious problems to be considered is near a solution, and as it is from the lack of facility for the rapid emptying of the living contents of the building that the greatest menace to life and limb arises.

As to the construction itself, after this first great advantage has been secured the next step toward the desired end is the complete separation by thick brick and mortar walls of the stage from the auditorium, extending the stage portion of the building and its walls above the highest elevation of the roof of the auditorium and the installation in the stage or proscenium opening of a thoroughly tested fire curtain so arranged that its action will be quick when the emergency arises. The roof of the stage should be supplied with skylights or openings that will be open and free should fire occur, acting as chimneys for this, the most dangerous portion of the building, where fires most often originate. The flames and smoke are thus diverted from the auditorium, where human life in abundance might be their easy prey. A possible fire would thus be more easily confined to a small space, and there would be less danger of the audience becoming panic stricken by the smoke permeating the auditorium. Another novel feature which admits of freer entrance and exit is the automatically closing and revolving seat, which gives almost unlimited aisle space, and thus helps to remove dangerous obstacles in cases of fire or panic.

The making of the stage itself fireproof, or, at least, fire-confining, is not so difficult as it is likely to be considered. There are now in this country theatres where the stage itself is built of steel beams and fireproofing, the bridges on either side and the gridiron above of steel, with fireproof roof above all, thus reducing the fire danger to a minimum, and, in some cases, it is still further reduced by chemically-treated scenery. If all this is done, much has been accomplished toward the attainment of our ideal.

So far as the auditorium is concerned, the use of fireproof material can here be made particularly adaptable, notwithstanding the apparent absence of the straight line from its constructive features, and instead, the glorification of Hogarth's dictum, "The curved line is the line of beauty." Several practical examples of fireproof construction applied to auditoriums exist in this country. Among the earliest of these is the little theatre adjoining the Great Southern Hotel in Columbus, Ohio. Here steel beams were used largely, and one of the most notable developments was the almost total elimination of columns for the support of galleries, there being only one at each side of the building, situated so that they adjoined the two side aisles, these being introduced merely to reduce the span of the large box girder which supports the entire gallary. Each gallery is carried by a single deep box girder completely hidden from sight. The beams supporting the gallery floors act as cantilevers, with the girder for a fulcrum, and using the top flange or cover plate for their support, with light ceiling beams framing into their lower flange, making a flush ceiling curved back of the girder and producing a better architectural effect than a straight ceiling. By the use of this deep girder construction, all obstructions to sight and sound ordinarily offered by the columns are removed, and the whole auditorium has an open effect that is peculiarly attractive. The entire ceiling or dome of the auditorium is carried by a steel framework of angles curved to produce the trumpet dome effect, similar to that of the Chicago Auditorium, with which, doubtless, so many of our readers are familiar. This ceiling frame is pendant from the lower cords of the steel trusses which carry the roof. The "flare-out" from the proscenium arch, forming the opening of the trumpet, is also made of steel angle framing, and the proscenium boxes are built up of steel beams and angles.

The parquette floor rests on beams framed to the slopes required. The support of this floor, as can be readily appreciated, is a comparatively easy proposition, the girders into which the beams frame being supported by columns which, being in the basement or cellar of the building, do not interfere with any arrangement of the seating, seeing or hearing, the main things sought for in theatre construction.

A theatre on similar lines to this, but very much larger in every way, is the Nixon, erected in Pittsburg during the last few years. Here the first great advantage referred to in the early part of this article is secured. The building is surrounded by streets or alleys, except at the rear of the stage, with ample means of exit, interior stairways and exterior fire escapes for both galleries, and, in addition to these methods of egress, there is introduced a most novel arrangement for the easy handling of crowds. This consists of gradual slopes or broad aisles on each side of the building, starting from the front entrance and gradually rising from the first floor until the level of the lower balcony or gallery is reached. These two slopes are of ample width, and so gradual and easy that a crowd should be able to escape from the first gallary in case of fire or panic, with the danger of accident reduced to a minimum.

In addition to these two slopes, the gallery is also supplied with two separate flights of stairs which reach the back or highest part. From this point two easy slopes run down the sides to the front of the gallery, thus making four separate avenues of exit exclusive of the exterior fire escapes on each side of the building. The upper gallery is supplied with entirely separate staircases with entrances and exits on the two side streets or alleys, and, in addition to these, there are the exterior fire escapes.

The stage building is separated from the auditorium by heavy brick walls carried above the top level of the auditorium roof, so that the stage is, in a way, a building by itself. Beams or steel framing were used for the floor of the stage as well as for all floors, galleries, staircases and slopes in the auditorium. The roof of the stage building is supplied with skylights which are opened from the stage below, making complete draught in case of fire. The galleries are carried by large cantilever trusses extending over transverse girders acting as fulcrums, which in turn are supported by columns. These columns, however, are reduced to a minimum and so placed that they offer little, if any, obstruction to the view. The seating capacity of these galleries is large and the main lines are so arranged that nearly every seat in the house commands a complete view of the stage. The entire effect is one of openness and roominess, the aisles being wide and the space between seats permitting easy ingress and egress.

In this article only two existing theatre buildings have been mentioned, and these only in a very general way as illustrations of the fact that reasonable construction, consistent with our best knowledge, is attainable and prac-

Dining Room in Residence of Mr. F. W. Braun, Los Angeles *Hunt & Eager, Architects* C-337a

ticable. There are several others of comparatively recent construction which are quite as good as, if not better than the two described, so that sufficient object lessons have been given of how such buildings can and should be erected. This being so, positive action should be taken in every community or state to compel proper care and intelligence in design, conforming to carefully drawn ordinances, which shall be executed by the authorities and not become simply a written, inactive dead letter.

The final results from a serious theatre fire may be so serious and widespread that they often reach the magnitude of a public calamity, like the terrible Chicago holocaust, which is still green in our memory.

Admitting that such improved construction will materially increase the cost of the building over that of the usual construction, surely the necessity for a higher regard for human life more than warrants this extra cost, and, indeed, is obligatory upon any well-organized community of our modern civilization.

* * *

The Barossa Concrete Dam

The United States reclamation service that is engaged in the work of reclaiming the arid wastes of the Southwest by vast systems of irrigation has taken up a study of the work performed along similar lines in Australia, and there the great Barossa arched concrete dam is typical of much that has been accomplished. Concerning this dam, the chief engineer engaged on the work, Alexander B. Moncrieff, has submitted an illustrated memorandum to the "Transactions" of the Association of Civil Engineers of Cornell University.

The Barossa dam is used to impound water for the town of Gawler and its vicinity, and the supply above what is needed for domestic uses is taken to irrigate the land. The dam is in a gorge 370 feet wide at the crest elevation, and 94 feet above the ground line at the bottom. The structure is arched in plan, the radius of the crest being 200 feet. The total length along the crest is 472½ feet.

The City Beautiful

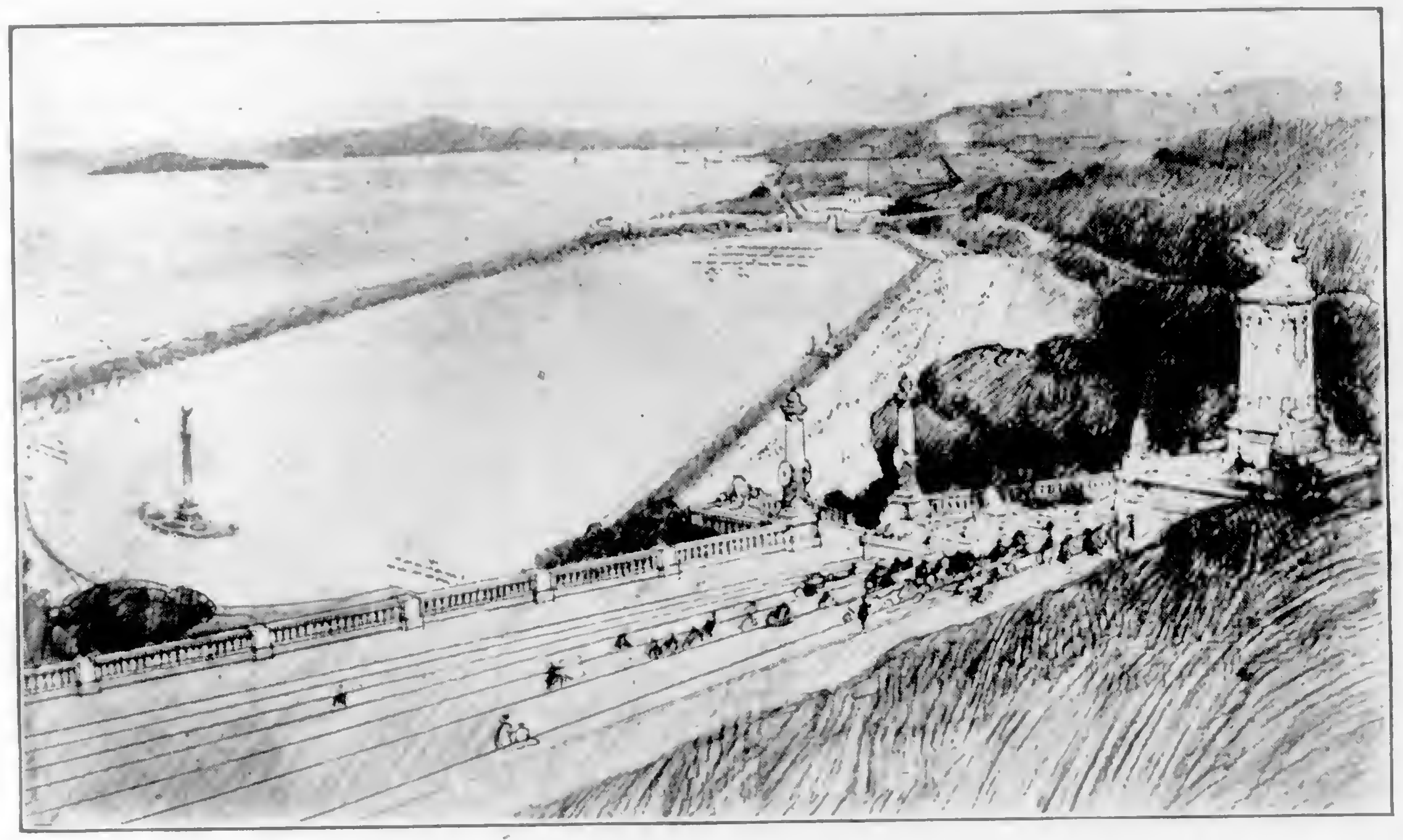
The San Francisco of the Future

By MR. HERBERT E. LAW

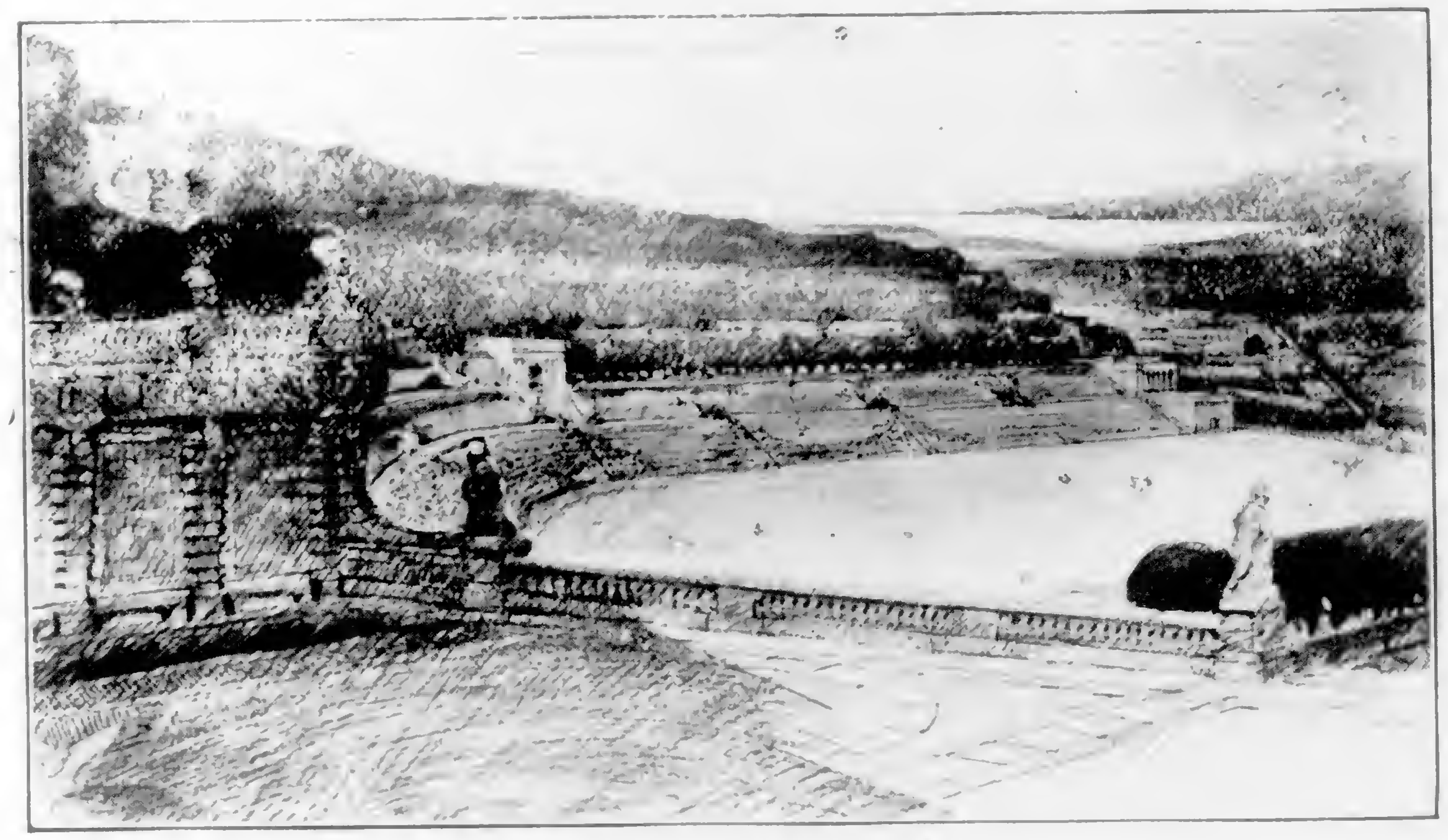
In the September and October issues of the Architect and Engineer there appeared excellent articles on the Burnham plan for beautifying San Francisco, by John F. McCaleb, secretary of the Association for the Beautification of San Francisco, and Charles Brown, architect. Both papers were accompanied by illustrations furnished exclusively to this magazine by Mr. Burnham. The drawings were, in fact, the first to appear in print, after Mr. Burnham had submitted his report to the Association. In view of the interest shown in the report, the following article, written by Mr. Herbert E. Law and published in the January Craftsman, is interesting in that it takes up various phases of the plan not previously covered to any extent in the Architect and Engineer:

"Not to be outdone by her Eastern sister cities, San Francisco, too, is entering upon a systematic plan of adornment and improvement. She has had her civic awakening; much of it due to a very active Merchants' Association, which during the ten years of its existence has not only brought about many reforms and improvements, but has also stirred up public spirit. A second organization that has done much good is the Association for the Advancement and beautification of San Francisco. This organization was formed in January, 1904, with ex-Mayor James D. Phelan at its head. In the search for a mind capable of realizing these high ideals the Association was fortunate enough to secure the services of Mr. Daniel H. Burnham, builder of cities. Ample funds were provided to permit Mr. Burnham to work unhampered. Mr. Burnham has developed great enthusiasm over his task. He has expressed himself to the effect that San Francisco affords unprecedented opportunities for accomplishing great results in city building; that it has one of the noblest sites of all the cities of the earth.

"The problem, stated in Mr. Burnham's own words, is this: 'It is proposed to make a comprehensive plan of San Francisco, based upon the present streets, parks and other public places and grounds, which shall interfere as little as possible with the rectangular street system of the city.' Such subjects are covered as the direction and length of all the proposed streets, park-ways and boulevards; the size and the location of proposed places, round points and playgrounds; the size, location and broad treatment of proposed parks. Plans for a Civic Center form an important part of the work. There are, moreover, a number of practical suggestions regarding such subjects as the location and relation to one another of the several elements of the city—administrative, industrial and residential; the control of traffic and of the various public conveniences; the control of domestic and business architecture; the beautifying of streets, sidewalks, etc.



Proposed Stadium near Twin Peaks *D. H. Burnham, Designer* C-337
(Reprinted from the October *Architect and Engineer* by request)



Proposed Military Parade Ground at the Presidio *D. H Burnham, Designer* C-338

"Before detailing something of these plans it will be well to point out briefly the topographical peculiarities of San Francisco. Unlike many Eastern cities, whose means of communication with the surrounding country are evenly divided among their radial arteries, San Francisco is situated at the extremity of a peninsula forming the northern outlet of the great Santa Clara Valley. A break in the Coast Range Mountains, a little over a mile in width, has joined the ocean and the bay at Golden Gate Straits. Down the western side of the peninsula run the low hills of the Coast Range, its base lapped by the Pacific Ocean. To the north and east, the city is bounded by San Francisco Bay, which follows the peninsula southerly on the eastern side for nearly fifty miles. Thus the city can, in the future, develop only to the south.

"The other peculiarity is the hilly formation of the city and the manner in which the streets have been cut through. San Francisco has been aptly called the City of a Hundred Hills. Whatever the approach, one cannot travel far without going up hill and down dell and down dell and up hill again. The whole northern portion is such a succession. The approach by water either from the north or east gives a vivid idea of this conformation. Also a too vivid idea of the way in which the difficulty of locomotion was overcome by the forthright Anglo-saxons who laid out the city in their impatient way. They plowed their streets straight up and over and down the hills, regardless of contour regardless of everything except to "get there." At first view from the bay the city looks like a checker-board, marked in every direction by what seem to be ditches, cut at right angles. These are later seen to be streets. One of the most difficult things will be the modification of these rectangular streets, especially in the hilly districts. To this we will return later.

"The core of the New San Francisco is to be the Civic Center, located at and about the geographical centre of the city—the junction of Van Ness avenue, the principal boulevard, running north and south, and Market street, the city's main artery, extending east and west. About the Civic Center, within a radius of a dozen square blocks, will be housed the administrative and intellectual life of the city, including the Post Office, a new $2,500,000 building just completed; the City Hall, the grounds of which will be enlarged and co-ordinated with the scheme, and the Public Library. The site has already been purchased—a square block on Van Ness avenue near Market street. A million dollar building will be started next year. This, with part of the money provided by the recent $18,000,000 bond issue. The proposed buildings for the Civic Center are the Opera House, the Concert Hall, the Municipal Theatre, the Academy of Art, the Museum of Art, a Technological and Industrial School, the Museum of Natural History, the Academy of Music, an Exhibition Hall and an Assembly Hall. Says Mr. Burnham: 'These buildings, composed in esthetic and economical relation, should face on the avenue forming the perimeter of distribution and on the radial arteries within, and in particular, on the public places formed by their intersection, and should have on all sides extensive settings, contributing to public rest and recreation and adapted to celebrations, etc.' As to its architecture: 'It must be vigorous if it is to hold its own and dominate the exaggerated sky-line of its surroundings. The climate of San Francisco admits of a bold style of architecture, for the atmosphere softens profiles and silhouettes. The column should be freely used as the governing **motif.**'

"The acquisition of the land necessary for the Civic Center is still quite practicable, as the property is residential and moderate in price, covered mostly with frame buildings. The Civic Center is the hub, from which all spokes of communication will start and converge. Mr. Burnham suggests that a grand vestibule to the city—the Union Railway Station—should be placed on the chief radial line from it. Thus located the Union Station will be not more than ten minutes' ride from the city's center.

"This chief radial line, striking south and west from the Civic Center, will be the Mission Boulevard, to meet the proposed reconstructed Camino Real, the old King's Highway, which traverses California north and south. As many more of these radial arteries are proposed as will be necessary for perfect inter-communication. They will all lead to the grand circular boulevard, the "periphery of communication," which will enclose the circumference of the city, a distance of thirty miles. Says Mr. Burnham: 'To this embracing highway all streets will lead and access may be had from any one of them to another lying in a distant section by going out to this engirdling boulevard and following it until the street sought opens into it. It should be a broad, dignified and continuous driveway, skirting the water edge and passing completely around the city. It should wind in and out, following easy contours and grades. At some points the Pacific will be disclosed, at others the beautiful Laguna County, with its gemlike water and its boundaries of high hills—like the high driveways beside the sea at Monterey and Bar Harbor.'

"Golden Gate Park, lying on the city's western edge, comes down on the east with its 'panhandle' to within fourteen blocks of Van Ness avenue. A few years ago Mayor Phelan started a movement for the city to purchase this intervening space, fourteen blocks long and two wide, and to bring the park by means of a panhandle extension down to the junction of Van Ness avenue and Market street, the heart of the city. Bonds were voted, but declared invalid by the Supreme Court on a legal technicality. Mr. Burnham plans great things for the Panhandle Extension, and declares it to be of supreme importance. By it Market street and the Civic Center will have direct communication with the city's main park. Bonds have been voted and will be used to connect with a boulevard the park and the Presidio (United States Military Reservation), a beautiful and extensive tract which parallels the park on the northern boundary of the city. Thence there already exists a fine drive easterly, overlooking the water, back to Van Ness avenue, completing the round trip.

"Of diagonal roads and streets Mr. Burnham has made ample provision, always bearing in mind, however, that the rectangular arrangement must be upset as little as possible. For the hilly districts he has planned a system of contour roads at various levels, connected by inclined plane at easy grades. In places too steep for building, he recommends that park space should be interwoven with the houses; belvederes built, and the summits crowned with foliage in the form of gardens or parks. Such treatment would work a veritable transformation in the best residence district and the hills of the Western Addition overlooking the bay and ocean.

"The city is already fairly well supplied with squares, and more have been provided for in the recent bond issue. Mr. Burnham proposes an increased number to meet future requirements, well distributed so as to cover the southern and poorer residence district. The exact sites should be chosen with a view to emphasizing their importance. The treatment should be in accordance with one general ideal, but individuality should nevertheless be preserved. In addition to the ordinary city squares, there is proposed a park for Telegraph Hill, a noted landmark overlooking the docks and shipping and the entire bay. Drill grounds are proposed for the Presidio, and a great terrace on the west, commanding an unrivaled view of the Golden Gate.

"As to the play-grounds, an ample provision has also been made. Their location is to be governed by density of population. They should be arranged for men, women and children, and they must be useful at all times and at all seasons. The scope of the play-grounds is wide; including social and athletic halls, swimming pools, dressing booths, etc. On the northern water front there are planned open bay swimming, recreation piers and yacht harbors. Thus for the San Franciscan of the next generation and his children will be minimized the disadvantage to bodily development that city life entails.

"Mr. Burnham's plans comprehend a treatment of the many beautiful eminences, to enhance both their artistic possibilities and their accessibility. Their tops are to be preserved, as much as possible, in a state of nature, and their slopes covered with trees and planted verdure. These hilltop parks are to have playgrounds for children, commanding beautiful and extensive views of the city. Mr. Burnham has the fine conception that children playing amid such surroundings and with such an outlook will thus from their earliest years receive an unconscious but valuable esthetic training.

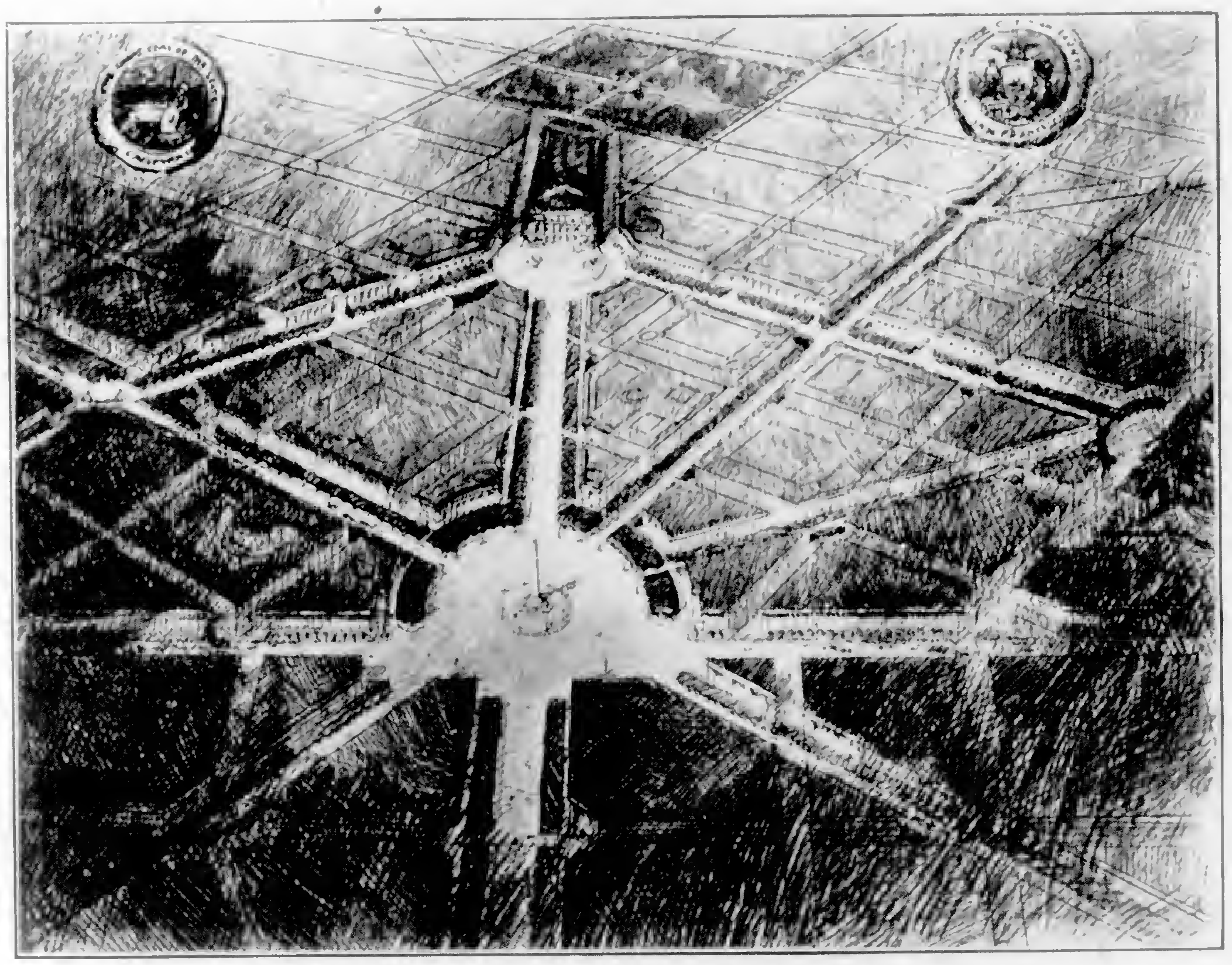
"San Francisco is a city of one street. There is no parallel in the world where one street has so much importance as Market street, broad and straight and nearly level, ending abruptly at Twin Peaks. But Mr. Burnham has conceived the idea of not permitting Market street to stop there. He will have it skirt the hills until it reaches the top and thence descend by a broad boulevard system, with many beautiful sweeps, past Lake Merced, joining finally the great circular boulevard. The esthetic and practical advantages of Twin Peaks have been overlooked, perhaps because this eminence is one of the most common sights of the city—ever present to those who throng the city's thoroughfare. But Mr. Burnham has much to say of and to do with Twin Peaks, which will become not only a public park, but a centre for great public fetes, in which the natural beauties of the city and county would be the chief attraction.

"Just back of Twin Peaks is a large, natural amphitheatre, amid groves of trees, recalling by location the Stadium in the hills at Delphi. This is suitable for horse shows, polo matches, football, etc. Nearby will be located an Academy for the accommodation of men in various intellectual and artistic pursuits. High in the hills grouped about is a sight for an Athenaeum, which will receive a few of the city's chief art treasures. The Athenaeum will consist of courts, terraces and colonaded shelters.

"While planning thus for the largest and most beautiful effects, Mr. Burnham has not neglected the smaller and more practical details. He would have grass and the bright-hued flowers which bloom so profusely in San Francisco planted to hide the ugliness of the fences. He would have small and suitable evergreen trees planted along the curbs. He says that the warmth may be increased and the wind and dust decreased by liberal tree planting, which has been hitherto generally neglected, as San Franciscans do not wish to cut off any sun warmth, of which they never have too much.

"An Art Commission is proposed to have charge of all matters pertaining to civic art and a partial list of matters for their control is enumerated: Public electric and gas poles and lamps, letter and fire alarm boxes, safety stations, street name plates, electric signs, shop fronts, bill boards, etc. He would also vest in this commission some control over domestic architecture, with respect to the general effect on the unity of the block. Also the cornice height of buildings in the business districts; pavements, curbs, signs, monuments, fountains, etc. The restriction of heavy traffic is recommended to the care of another special commission, which should also aim at measures to facilitate communication and avoid congestion. Such matters as the location of hospitals and of the almshouse, the location and arrangement of cemeteries, increased dockage facilities, etc., are gone into.

"All this which has been sketched is a large contract for even a large city to undertake. It would mean besides the doing of many new things, the more difficult overturning and undoing of much that has been done imperfectly or wrongly. Mr. Burnham does not minimize this. He has said: 'It will take more years than we will live; it will take more millions than we can guess.' But San Francisco is willing—that is the point. She is conscious of a great future. She is willing and ready to tax herself to meet it. Says Mr. Burnham: 'We must not forget what San Francisco has become in ten years—what it is still further to become. The city looks toward a sure future wherein it will possess in inhabitants and money many times what it has now. It follows that we must not found the scheme on what the city is, so much as on what it is to be. We must remember that a meagre plan will fall short of perfect achievement, while a great one will yield large results, even if it is never fully realized. Our purpose, therefore, is to stop at no line within the limits of practicability. Our scope must embrace the possibilities of development of the next fifty years.' And again: 'It is not to be supposed that all the work indicated can or ought to be carried out at once, or even in the near future. A plan beautiful and comprehensive enough for San Francisco can only be executed by degrees, as the growth of the community demands and as its financial ability allows.' "



Civic Center and Its Various Elements *D. H. Burnham, Designer* C-39

Painting*

A GOOD painter will often get better results with a fair paint than a poor workman will get with a praiseworthy one. The method of application is about as important as the quality of the paint used, for the reason that a layer of air and water which it may hold exists upon all surfaces. This layer of air prevents close adherence of the paint to the surface, and it can only be gotten rid of by thoroughly brushing the paint out onto the surface and into the body of the material underneath. A distinguished British painter and author writes: "The less paint that is put on at each operation, consistently with a proper covering of the ground, the better will the ultimate result be. Less paint and more painting," he impresses as a need "to quite 90 per cent of his painter students." The personal equation always counts in painting as it does in almost everything else. From experiments with an ocular micrometer in connection with a microscope, we find that single coats of the same paint may vary in thickness from 1-500 inch to 1-1000 inch. The variations in thickness from these extremes and intermediate points are due to the varying pressure of the brush under the hands of the painter. Much of the poor work done nowadays results from the quality of the tools purchased by or supplied to the painters. We insist that a good workman to do good work must have good tools to work with; that is, brushes not over 3½ inches wide and full or thick with good, stiff bristles. For the highest class of work we prefer what they call down East "pound brushes"—that is, round brushes with good, stiff okatka bristles in them, not less than six inches long. With one of these properly bridled, a painter can do more and better work in a day than it is possible for him to do with the ordinary flat brush that is usually furnished him, and which costs little less. The good workman will always pay special attention to the coating of edges, and those parts of a structure where water and dirt will lodge, and to the filling in of all crevices, beads and mouldings to prevent the incursion of water. These hidden parts are often the vital ones in bridges or in buildings of steel-cage construction, and they are those which should have the most vigilant and constant attention.

The durability of paint will be affected by the number of coats applied —e. g., two coats of paint will wear better than one; three coats of paint will wear better than two and four coats of paint will wear better than three. The theory upon which we design coatings, both for wood and for metal, is, that the primer or foundation coat should be considered as structural material whose function is both to exclude air and moisture from the material underneath it and to form a receptive surface for subsequent coats. It is further our theory that in the sequence of coats this primer or foundation coat should dry more quickly and harder than any one covering it. Where it is desired to finish a structure in white, or in a light tint composed largely of a white pigment, we have reason to infer that it is wise to limit the number of coatings applied to three, exclusive of the primer; the reason for this limitation being that our knowledge includes no inert pigment which, when used alone with linseed oil, will have sufficient hiding power to serve as a satisfactory paint pigment. The consequence is that to produce a good paint in white or some light tint it is necessary to use pigments like white-lead or zinc-white that react with the oil and continuously weaken it until its power as a binder is finally destroyed. With paints made from inert pigments and linseed oil it is undoubtedly true that, provided a sufficient interval be allowed to elapse after each coat for it to dry and harden, the greater the number of coats and the greater the total thickness of the layer, the greater will be the degree of impermeability to air and moisture, and also the greater the degree of resistance to atmospheric influences.

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*Extract from a paper by Mr. Houston Lowe read before the Engineers' Society of Western Pennsylvania.

Linseed oil in drying takes something from the air—viz., oxygen—and gives off something to the air—viz., carbon-dioxide and water. Mulder describs the process beautifully and calls it "the breathing of the drying oils." The things favorable to the drying of oil paints are light, pure, dry air and moderate artificial heat. The things unfavorable to the drying of all paints are a humid atmosphere, darkness, noxious gases and low temperature. The amount of time which should be allowed to elapse between coatings of any given oil-paint will vary so much with the location of the structure, the kind and condition of the surface, the quality of the paint, the atmospheric conditions when the painting is done, and for the first few days after it is done, that it is obvious no set period of time can be named. However, a painter who is interested in his work can always determine whether one coating is fit to receive another by noting its lustre, the time when the paint no longer sticks to the dry skin of the finger, and the time when the layer cannot be moved under heavy pressure. Blistering, cracking and peeling of paint are often due to the fact that under-coats were too elastic when they were painted over. If a piece of work be painted coat upon coat of oil color before each coat is sufficiently dry, the movement and shifting of the under-coats in their effort to obtain oxygen for their proper hardening will either rupture—i. e., crack—the top coats or lift them up in the form of blisters. Pearce, in his excellent book on painting, says that four days is not too much to allow for the proper drying of oil color which will nominally dry in twenty-four hours. The period may be shortened by additional driers; but a good rule is to allow all paint to stand four times as long as it takes to arrive at superficial dryness.

C. W. McCall, Architect C-310

The Architectural League of America

Announcement of a Competition for a Foreign Traveling Scholarship.

UPON the result of this competition will be awarded a Scholarship in Architecture, allowing the recipient $1,200, to be spent in foreign travel under conditions outlined below:

A competitor must be under the age of 35 years at the date given for the preliminary competition.

He must have been a member of one of the architectural organizations constituting The Architectural League of America for a period of six months prior to the date of the first competition.

He must not be in the active practice of Architecture either alone or as a member of a firm at the time of the competition.

The fact that a member has once been a practitioner, but has since relinquished his practice will not debar him from the competition.

PRELIMINARY COMPETITION.

February 25th, 9 A. M.—9 P. M.

The officers of each club will designate a place in their city where this competition will be held and will also appoint a member of their club to act as an officer in charge of the competition.

Competitors will report at the designated place and to the officer in charge, at the time mentioned, and each will come provided with materials and instruments necessary to prepare sketches of a problem in design the subject of which will be given them upon their arrival.

No competitor will be allowed to leave the premises during the twelve hours given for the completion of his design except that he surrender finally his drawings to the officer in charge.

Each competitor will on or before the expiration of the twelve hours hand in his drawings, signed with his full name, address and name of club, and these will be forwarded by the officer in charge to the Secretary of the Architectural League of America.

A competitor must also keep a complete set of tracings of his design for his future reference.

Drawings to be in the hands of the Secretary of the Architectural League of America on or before April 24th, 1906.

The competitors in the preliminary competition will develope the design submitted and present the drawings called for in the "Programme of the Competition" given them at the time of the preliminary competition.

These drawings will be signed with the author's full name, address and name of Club of which he is a member, and must be accompanied by a sworn affidavit that they are the unaided work of his own hand.

Each competitor will present with his final drawings an essay of not more than 2,500 words in which he will state what he considers to be the chief function of such a scholarship as this one. What advantage he expects to gain from it in case he should win it, and what, if any, are his special predilections toward architecture. This essay to be typewritten on manuscript paper.

The drawings submitted in this competition will be judged by three representative architects selected from different localities. The judges will be named on the programme.

In making out the itinerary the committee having the competition in charge will endeavor to consider the personality and inclinations of the winner in as large a degree as seems to them reasonable and in the best interest of the scholarship.

In the programme of study the above will also hold true, but the winner will be required to specially observe and report, as directed, on some subject which will be designated relating to the improvement of cities.

The member awarded this scholarship must avail himself of its advantages within six months after the award is made, and will be required to spend not less than one year, nor more than fourteen months in foreign travel, according to the route laid out for him.

All other necessary information will be contained in the "Programme of the Competition."

Further details are given in the following letter by President N. Max Dunning:

"It is desired to call your attention to the three scholarships above mentioned, and to lay particular stress at this time upon the great value of the one scholarship for regular standing, to be awarded to that member of The Architectural League of America passing the highest entrance examinations as hereinafter described.

"It should be made the duty of the officers of each of the clubs constituting The League to impress upon the younger members the importance of this scholarship. In doing so it would be well, it seems to me, to either have the matter brought up and commented upon at one of your meetings, or to advise your members of the opportunities thus offered, setting forth in your statement the splendid advantages that this scholarship will provide for ambitious young men desirous of securing an education in architecture.

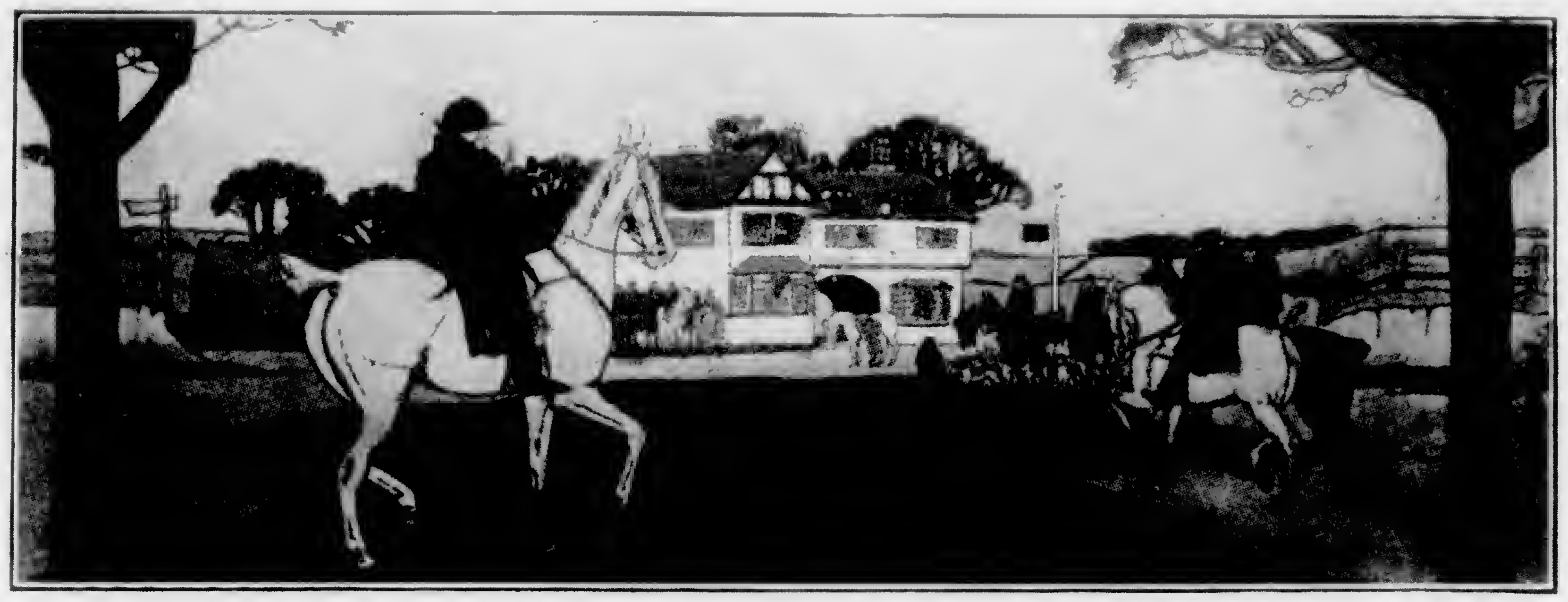
"In presenting this matter to your members, the fact should not be lost sight of that an opportunity to attend Harvard University means far more than the mere architectural training a man will receive. He will enjoy an atmosphere of culture and will have opportunities of attending lectures on many subjects apart from these included in the curriculum of architecture. He will have the use of the splendid libraries and will be thrown among those influences which make for a greater culture and a more intelligent appreciation of the relation of his future work to wider interests.

"The regular entrance examinations, upon the result of which this scholarship for "Regular Standing" will be awarded, will take place in June and September in most of the large cities of the United States.

"Any member desiring to compete for this scholarship should forward his name, as a League Member, to Professor H. Langford Warren, Department of Architecture, Harvard University, and also write to Mr. James Lee Love, Secretary of the Lawrence Scientific School, Cambridge, Mass., who will forward him a catalogue and all necessary information pertaining to the requirements for admission and examination.

"You will realize the importance of placing this information before your members immediately, in order to secure the best results, as a good many of the young men who would be anxious to avail themselves of this opportunity will require some preparation before they will be ready to take the entrance examinations in June or September.

"A young man winning this scholarship for regular standing may, at the discretion of the Architectural Department of Harvard University, at the end of his first year, be awarded one of the Special Scholarships which would give him free tuition during the second year. At that time he will be competent to enter any of the numerous regular scholarships provided by Harvard University."



Interior Decoration
Up-to-Date Furnishing

New Art in Decorative Work

By C. WALTER TOZER

THE general prosperous condition of the people in general throughout the whole country is leading them to devote their attention and money to the subject of interior decoration. The demand for the better grade of goods is greater than ever before, and this encouragement has compelled the manufacturers of decorative goods to put forth every effort to produce the best. To-day sees some wonderfully beautiful paper-hangings and wall-coverings being placed on the market. The past few years have brought some radical changes in the decoration of homes.

A generation ago a highly colored and richly patterned wall paper was considered all sufficient, and the harmony and fitness of color and design were often of secondary consideration.

Then came the "tinting and painting" period, where the exasperating red hall and green dining room, or else the green hall and red dining room, were found in every instance. If the walls were not tinted then the plain ingrain papers were used instead. In either case there was little or no opportunity for originality and variety.

Our desire for individuality has been recognized and is being carefully fostered.

The trend at the present time is away from the brilliant colors to the soft, rich tones; away from the set geometrical figures to those with beautiful flowing lines; away from the hard outlines to those softened by the use of two or more tones of the same color, and above all, from the small, hard and fixed repeat to one made as imperceptible as possible by many devices.

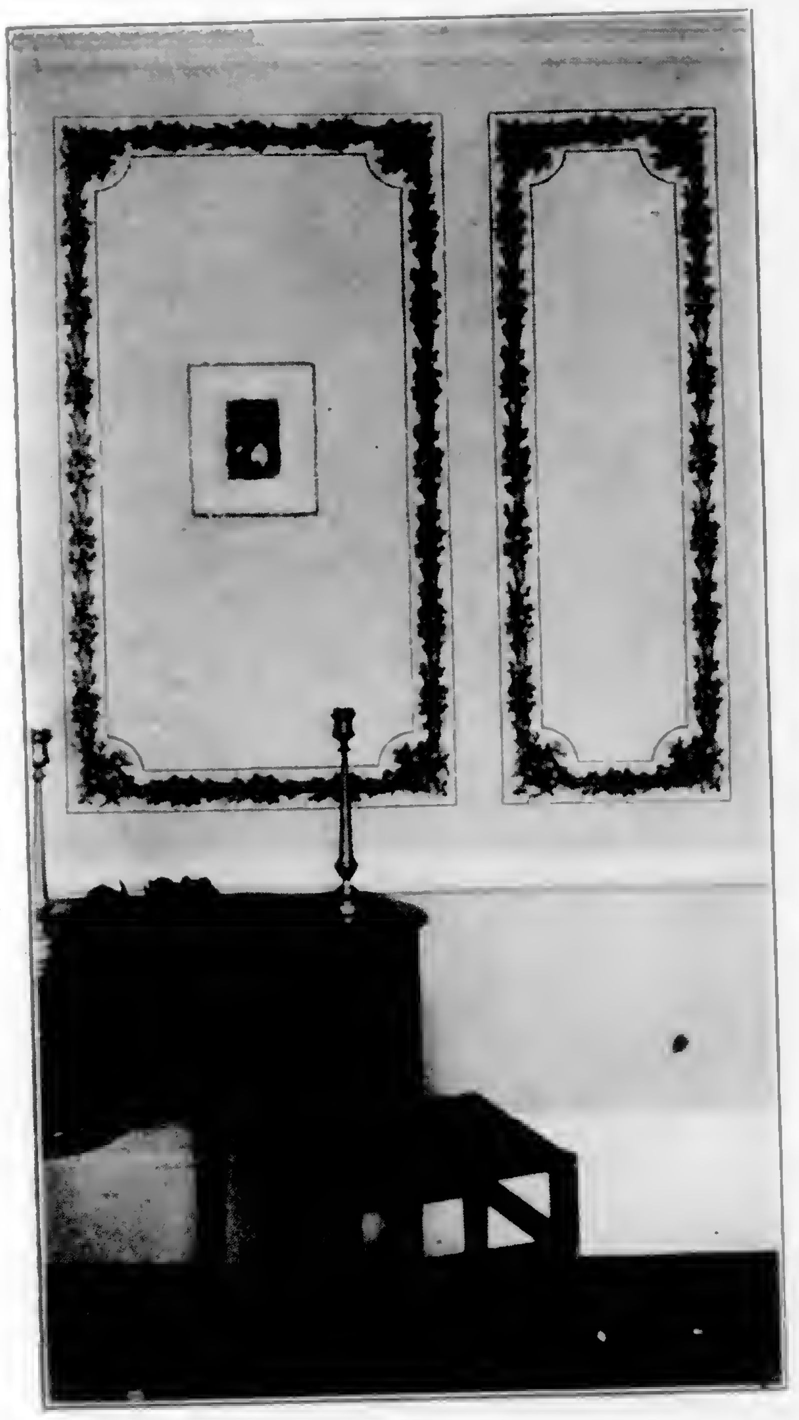
The methods at our command are now varied for making our rooms peculiar to ourselves. We have the opportunity of dividing up our walls in different ways; the wainscot, the side-wall and the frieze; or we have the lower two-thirds divided by a plate-rail from the upper third, or the lower third cut off by the chair rail from the upper two-thirds. The wainscot also often divides it in halves. Another arrangement very popular is the panel decoration. This effect is produced in a great many harmonious combinations, and we can combine them to suit ourselves and our rooms, having no fear that our neighbors, confronted with different conditions, will happen to strike the same combination.

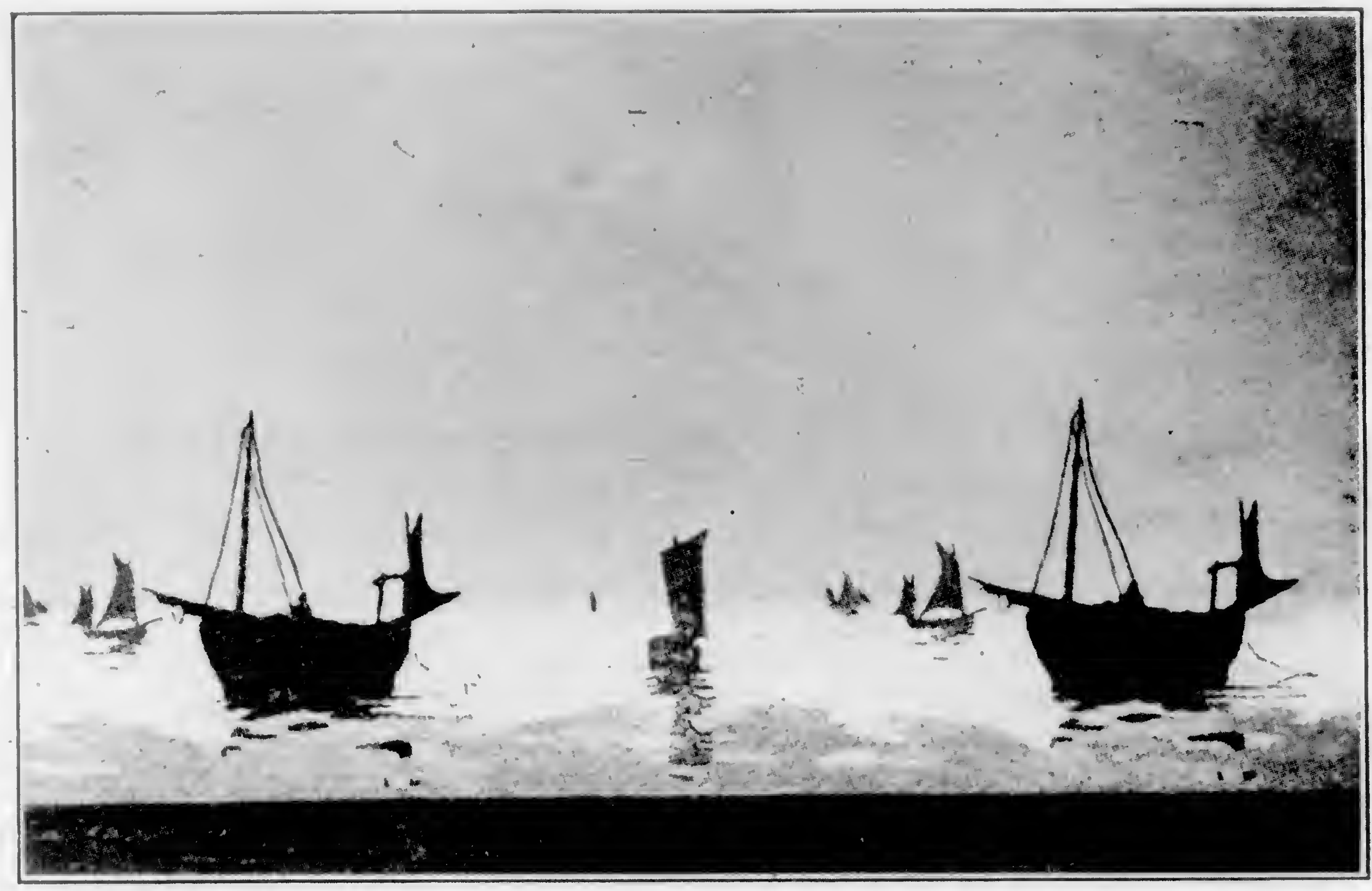
There are many interesting designs for the two-thirds treatment, either in art nouveau trees or vines, the long lines forming panels, their blossoms and foliage a crown frieze, or naturally growing flowers, their blossoms forming a crown for a wall of leaves. There is one of these effects with the poppy as the motif. Long stems, covered with the natural leaf growth, running up four or five feet above a wainscot. The large, bold poppy blossoms forming a crown frieze, and back and above these a faint suggestion of landscape and sky.

Quite different from these ultra-naturalistic papers and much pleasanter to live with for more than a brief interval of time, are the conventionalized papers, those embodying the theory that plant forms in their natural state are not adapted to the ornamentation of flat surfaces; that the colors must all be laid on in flat tones, without the slightest effort at relief. Different rooms naturally require designs based upon different principles. Conventionalized drawings are best suited to libraries, dining rooms and halls. They come in either two or three tones of the same color or in two or three different tones of two or possibly three contrasting colors. The two-toned papers are desirable anywhere and in any proportion; a whole wall, a half or a third.

Where the colors, however, are contrasting an entire wall is very often too much. In which case they should be confined to an upper third or frieze treatment. In all cases the use of a design based upon a very large motif must be conditional upon the size of the room.

The subject of friezes has become a very fascinating one. There are now so many beautiful friezes upon the market. The landscape frieze, with trees sharply outlined against the sky; then the soft toned landscapes and marines, and not the least the many charming nursery friezes. One of the beautiful landscape friezes is "The Survey." It represents a bit of English scenery with tall, slim ostrich trees in the foreground. The whole of the picture is sharply defined with the predominating tones in olive green. A group of the trees run about every four feet with low shrubbery at their bases. These are suggested by broad washes of dull olive. The trunks of the trees are also washed in the same shade of olive. The foliage at the tops are washed in burnt orange blended from the olive. There are glimpses of hills and close-cropped shrubbery in the background, in tones of olive, nile and burnt orange fading away into tones of gray-purple. The sky is beautifully clouded in wash blends of pale purplish orange and cream. This frieze could be used to admirable advantage in any large reception hall, dining-room or living-room, where the color scheme was carried out in the same tones, or even in a large bedroom where the ceiling was very high and the wall space broad.


A Panel Treatment C 310


The "Ebb Tide" Frieze C-311

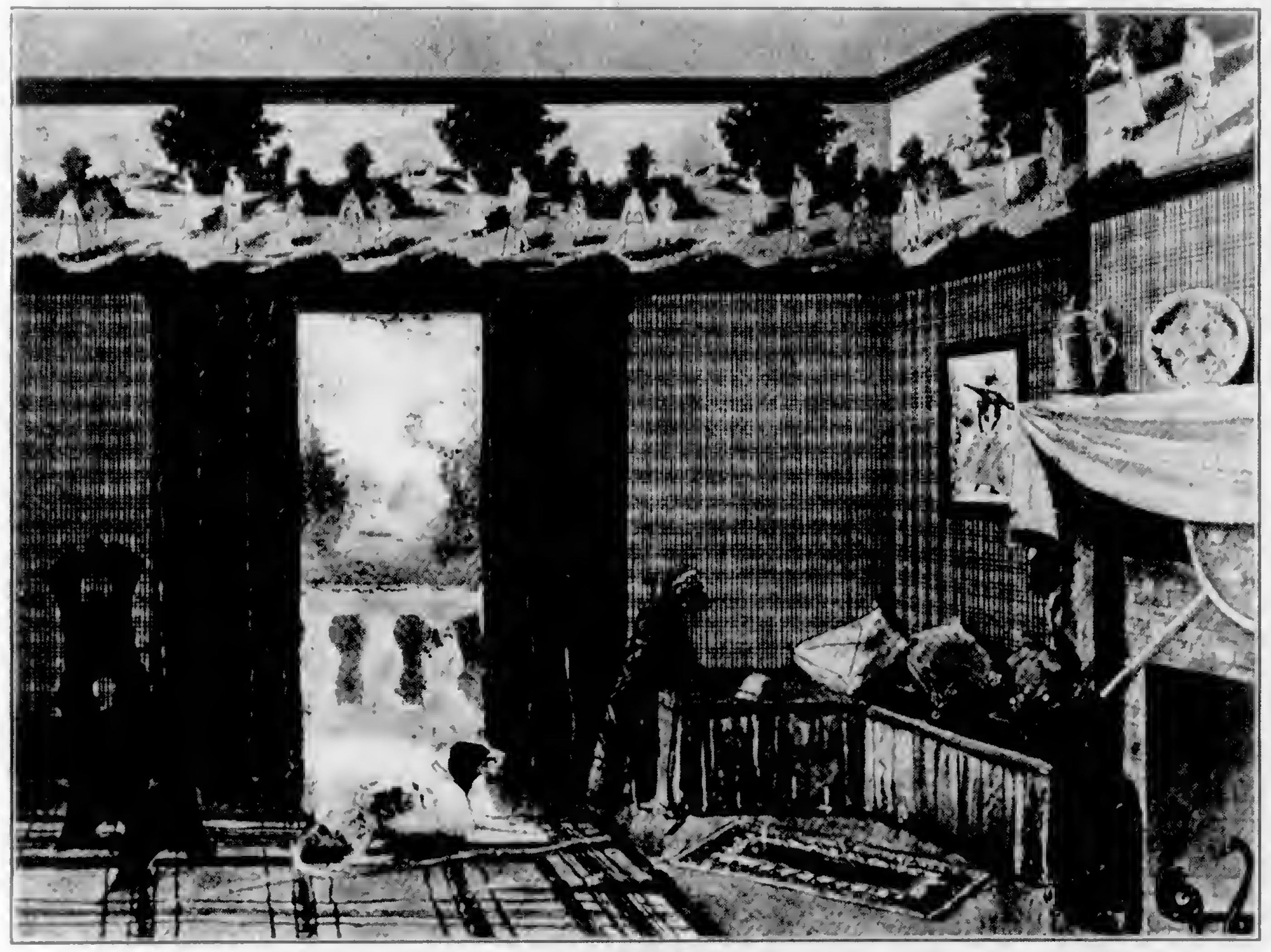
Another very effective frieze is a marine view called the "Ebb Tide." In the luminous tones of sea and sky and the wavering reflections of the boats lying at anchor, the water color effect is very natural, as there is ample opportunity for broad masses washed in light transparent tones. It is a very restful and simple design—only a few fishing boats in the foreground, some at anchor and others with sails set, departing on their missions. This frieze comes in several colorings, three of which represent sunrise, noon and sunset. The most effective, however, for general use is the coloring in soft yellowish green. Here the separation of the water and sky lines is hardly perceptible. In this particular coloring the frieze is appropriate for reception halls, dining-rooms and libraries, or even bed rooms of good dimensions. In the other colorings, however, its use should be confined to rooms that are not lived in constantly, such as halls or dining-rooms.

* * *

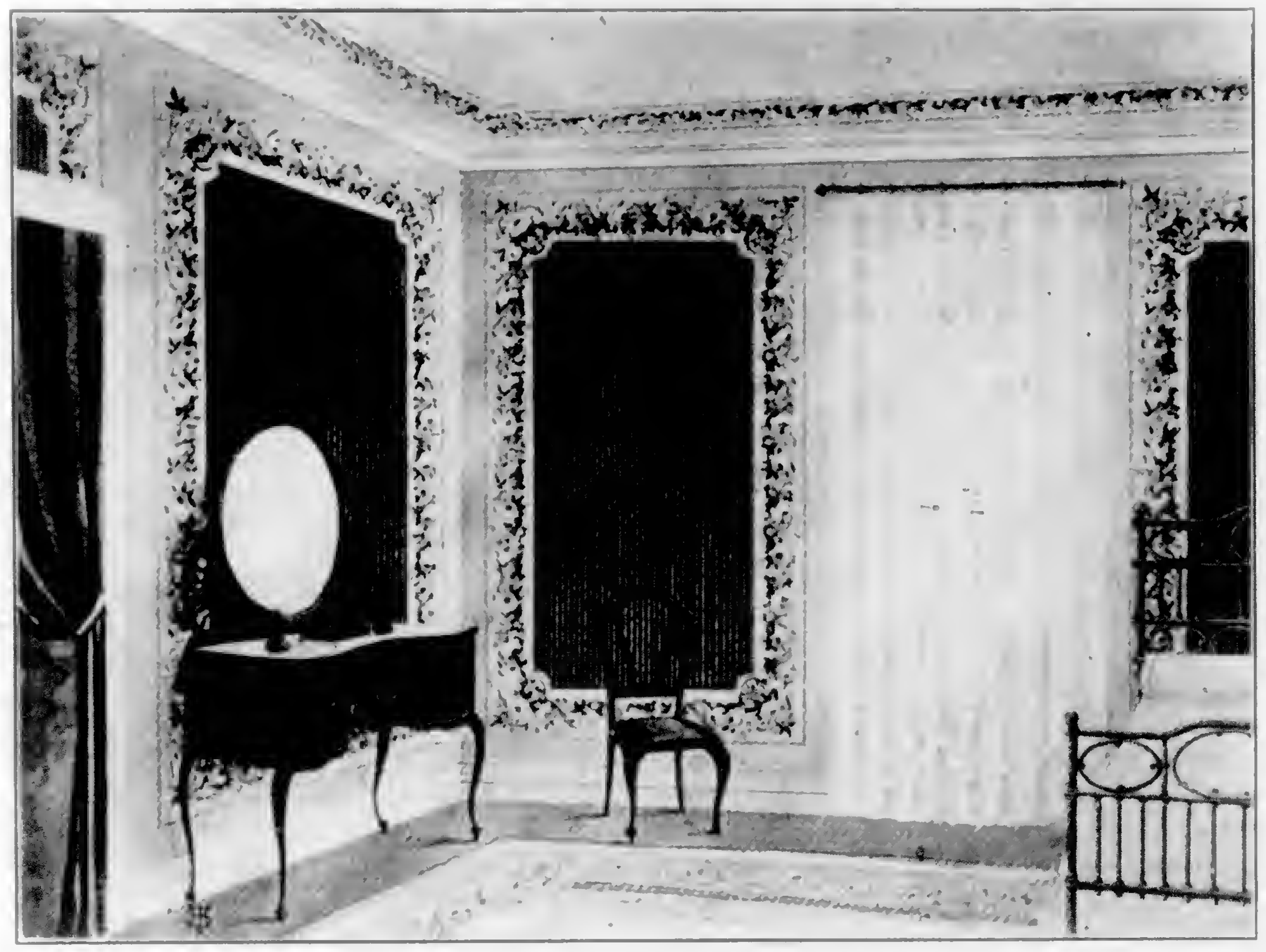
A man who is a friend only to himself has but few friends.

* * *

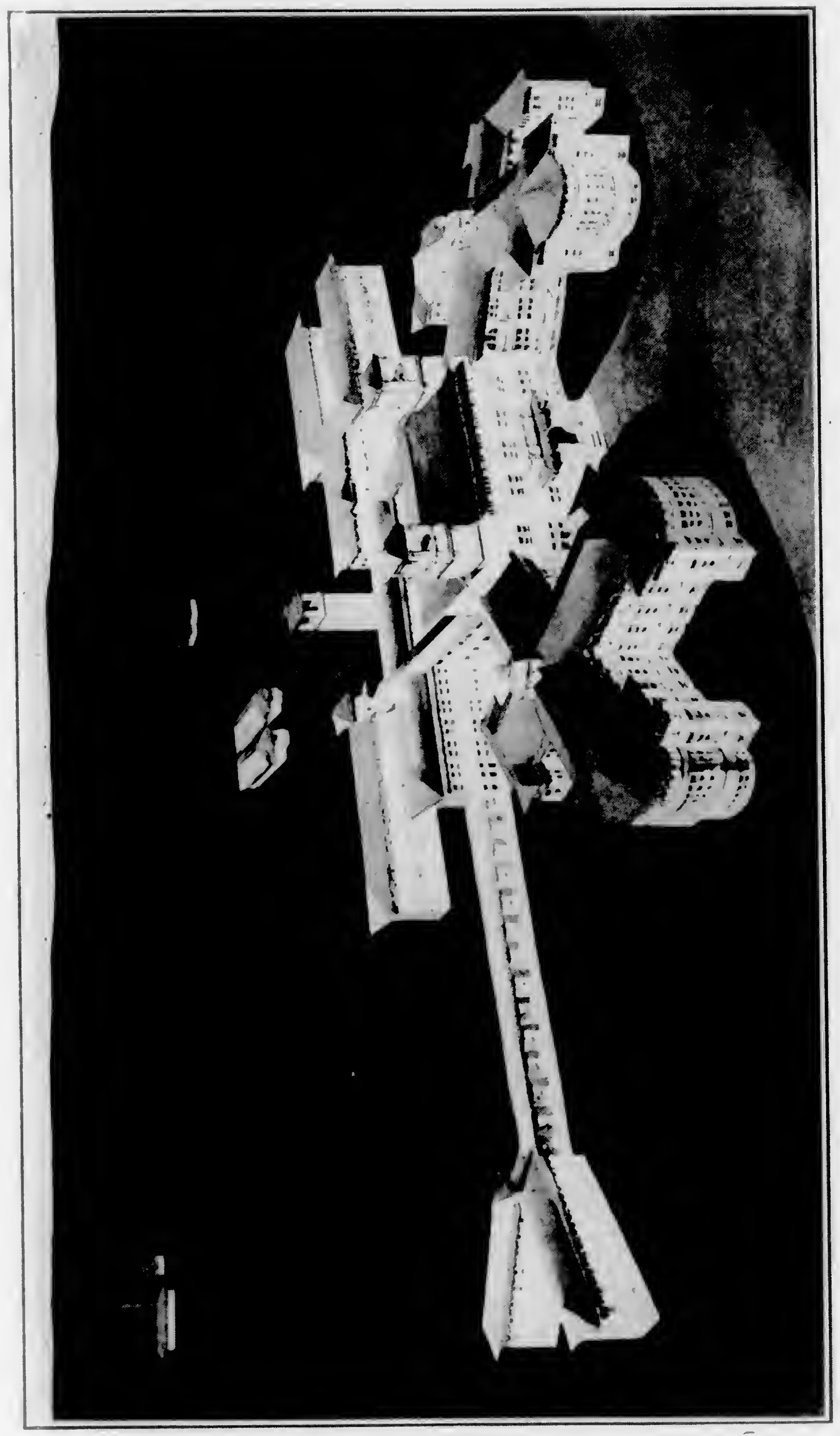
An undertaker never complains that he is worked to death.



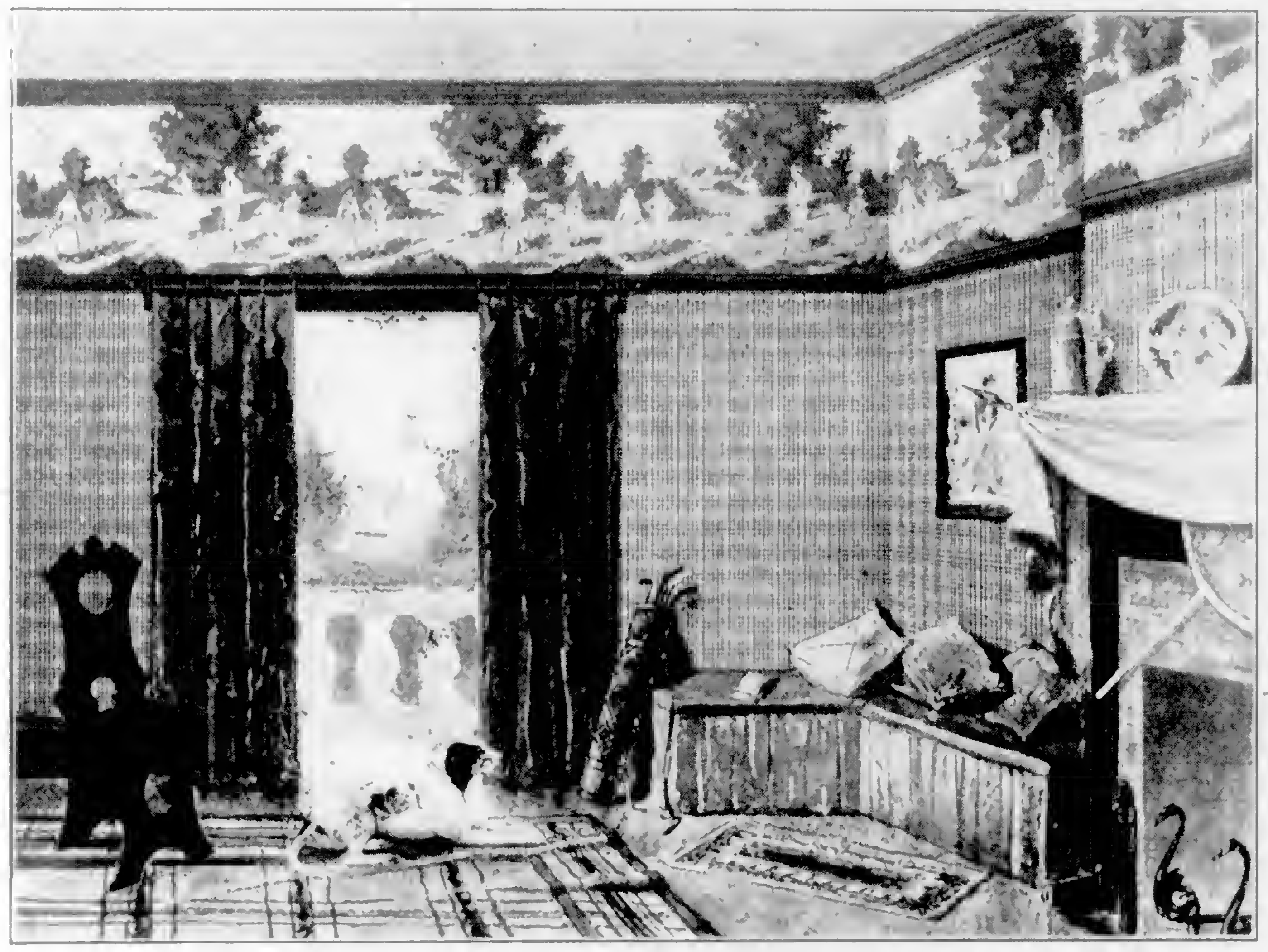
Decorative Suggestion for Country Home L. Tozer & Son Co. C-342



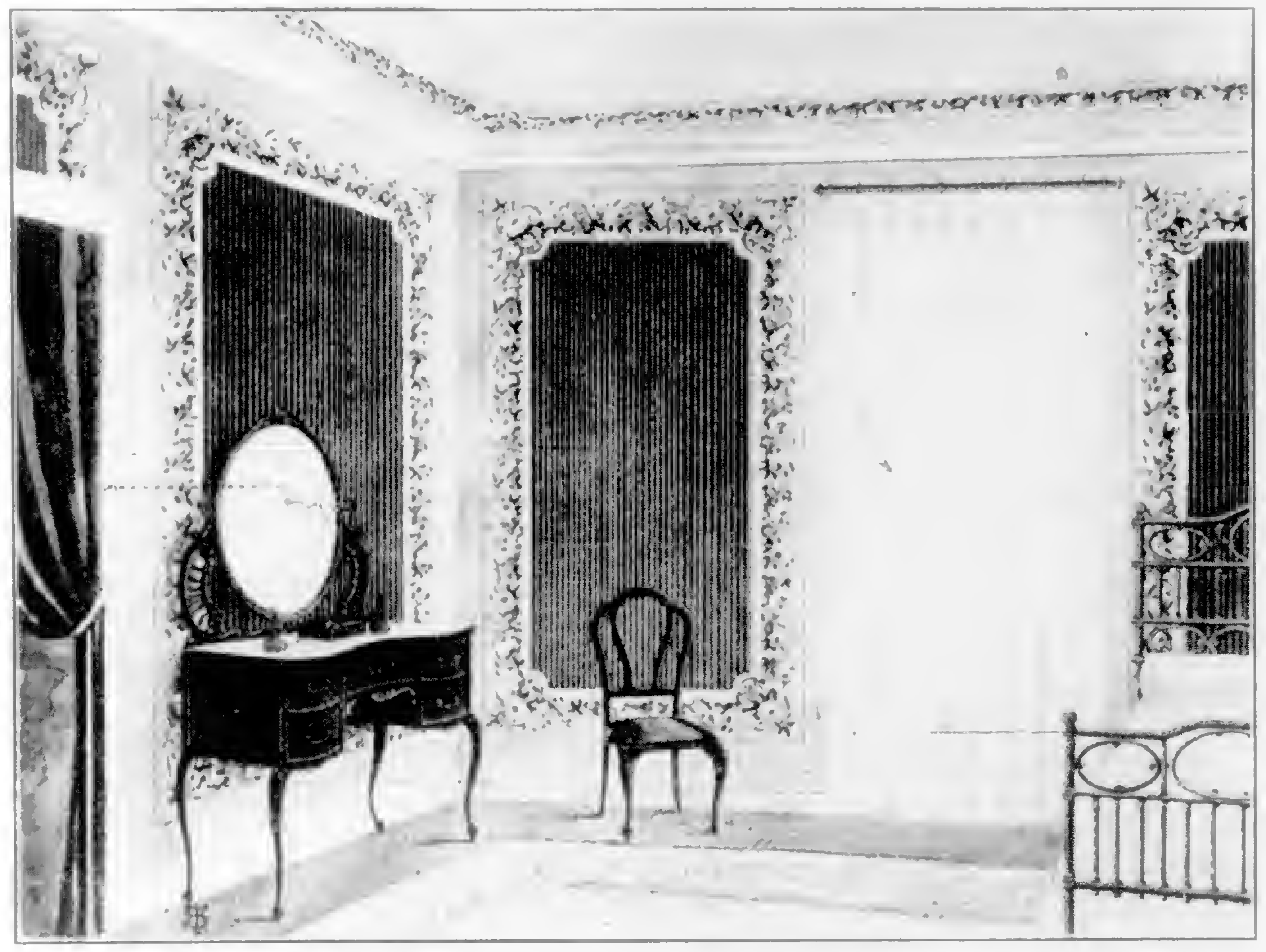
A Panel Treatment L. Tozer & Son Co. C-343



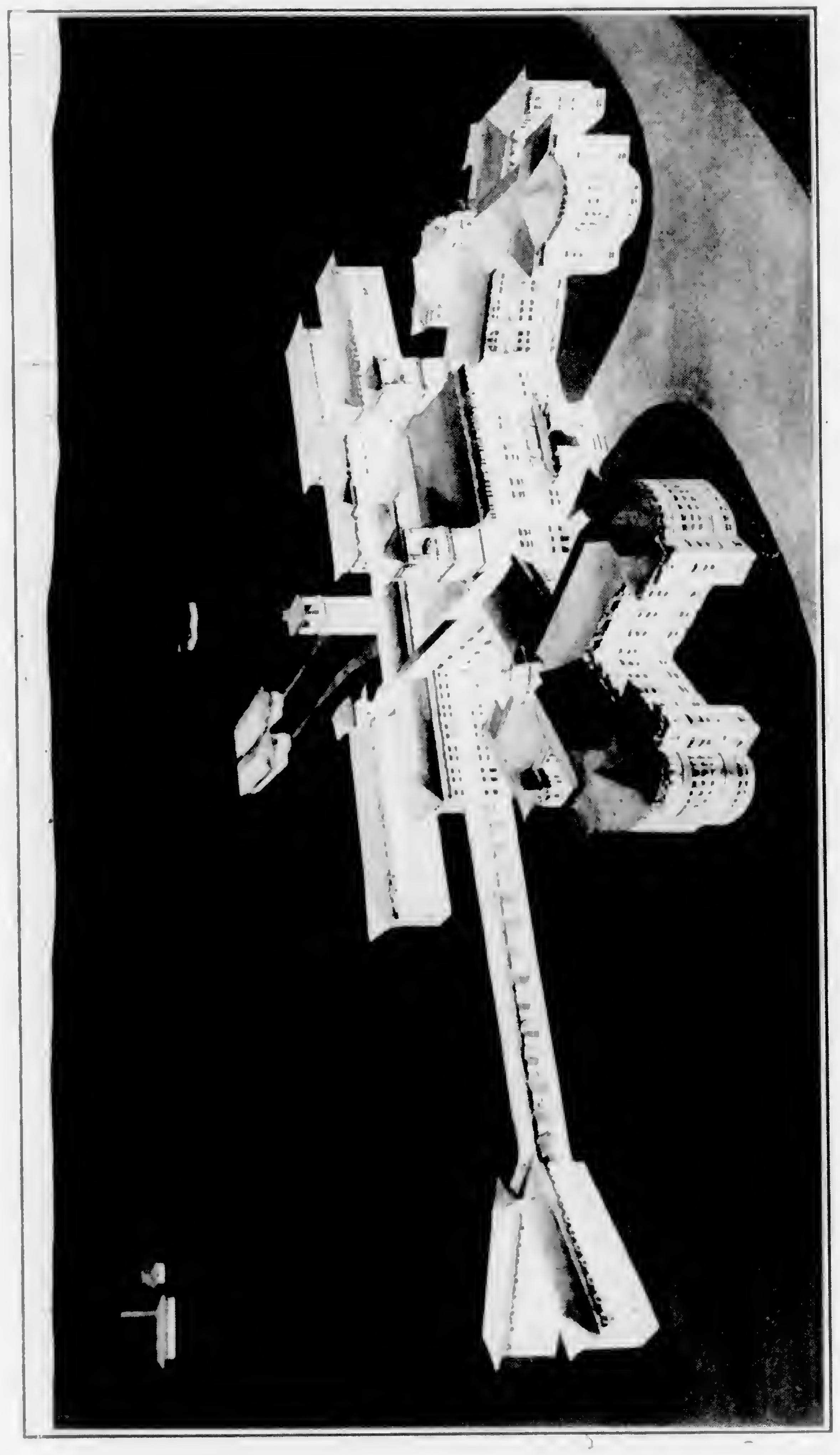
Unique Design for Hospital *William Knowles, Architect* C-344



Decorative Suggestion for Country Home — L. Tozer & Son Co. C-342



A Panel Treatment — L. Tozer & Son Co. C-343



Unique Design for Hospital — *William Knowles, Architect* C-341

Santa Fe Passenger Depot at Ash Fork, Ariz.
Harrison Albright, Architect

R. R. Burns, Chief Engineer
C. A. Morse, Acting Chief Engineer

C-345

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

Architect Henry A. Schulze has been in the East getting ideas for the proposed enlargement of the Olympic Club's building. The structure is to be raised several stories.

Architect A. Dodge Coplin, formerly of Oakland and later opened an office in the James Flood building, San Francisco, has removed to New York City.

Architect A. F. Rosenbaum of Los Angeles has been East on an important business trip.

Arthur Brown, Jr., and Henry A. Schulze have dissolved partnership, and Mr. Brown has formed a partnership with John Bakewell with offices at 731 Sutter street.

Architect William Curlett has moved his offices further west in the Phelan building where there is more available room. The offices of the State Board and San Francisco Chapter, A. I. of A., have not been changed.

The plans of C. W. Dickey of Oakland for a $250,000 family hotel to be built at Claremont have been approved. The hotel is to be four stories high and will contain 200 rooms. Old English will be the type of architecture.

It is likely that the new Scottish Rite Temple to be built in Oakland from plans drawn by Architect C. W. Dickey will be of reinforced concrete. This will be the first building of any pretentions to be built of reinforced concrete in Northern California.

A commission has been appointed to revise the city ordinances in Los Angeles affecting reinforced concrete construction. The commission is composed of Charles F. Whittlesey, chairman; W. S. Osborne, Joseph Simons and C. J. Kubach.

The Southern California Chapter of the American Institute of Architects held its regular monthly meeting January 9th in the Cafe Bristol. Besides the regular business, the following were elected to membership: Thornton Fitzhugh and N. St. Clair to be regular members, and P. A. Eisen a junior member. A committee consisting of John P. Krempel, Octavius Morgan and John Parkinson was appointed to consider the feasibility of acquiring property to build a home for the Chapter.

Attention is called to the classes being conducted under the auspices of the San Francisco Architectural Club. There are three classes as follows: Pen and Ink Rendering, Beaux Arts and Structural Steel, instructed respectively by Mr. A. O. Johnson, Mr. Charles Peter Weeks and Mr. Charles F. Archer. Each course is so arranged that new students may join at any time. The S. F. A. C. have not spared expense or trouble in order to make these classes a success and of benefit to the profession. Every draughtsman will find some benefit resulting from his attendance. The instructors are practical men and are teaching these classes the things they encounter in the course of each day's work.

Certificates were issued at the last meeting of the State Board of Architecture to A. C. Smith, 307 S. Broadway, Los Angeles, and H. Alban Reeves, Chamber of Commerce building, Los Angeles, they having qualified to practice architecture in the State by taking the examinations.

Stone & Smith, architects, in the new James Flood building, have outgrown their qaurters and on the 1st of March will move to suite 59 at 809 Market street.

Building Reports

High school, Bakersfield, Cal. Architects, Stone & Smith, Jas. Flood building, San Francisco. Cost, $50,000. Owner, City of Bakersfield. Plans of Stone & Smith.

Sealed bids will be received by the board of supervisors of Los Angeles county until 2 p. m., February 20th, for the complete construction of jail in Newhall, to be built in accordance with plans and specifications on file in office of supervisors, Los Angeles, and open to inspection to bidders.

Residence, W. Los Robles avenue, Pasadena. Architect, C. W. Buchanan, 99 E. Colorado street, Pasadena. Owner, John Haynes. Building will be two-story, ten rooms. Frame and cobble stone. Balconies in front and rear. Will be finished first-class throughout. Extra fine plumbing. Heated with hot air furnace.

Flour mill. Architect, C. W. Buchanan, 99 E. Colorado street, Pasadena, Cal. Owner, J. B. Cole. Building will be of brick, 60x100 feet, three stories and basement under 60 feet. Will be fitted with modern flouring machinery. Power not definitely decided; will be either steam or electricity.

Residence, S. Pasadena avenue, adjoining the residence of ex-Gov. K. Markham. Architect, C. F. Driscoll, 26 E. Colorado street, Pasadena. Owners, Mrs. M. F. Thayer, Madison avenue, Pasadena. The building will be frame, two stories, twelve rooms, finished first class. Hot air furnace. Contracts are now being figured.

Addition, Columbia building, Los Angeles. The lot is 62½ feet front by 155 feet deep, with a two-story brick business building at 612-618 S. Broadway. The walls are of sufficient strength to sustain the weight of three additional stories which will soon be added to the building.

Residence, 1006 Alvarado street, Los Angeles. Designer, Miss Lillian Tate, 414 O. T. Johnson building, Los Angeles. Owner, Mrs. Harris. The building is to be erected by Abner L. Ross and will be Mission in style, containing ten rooms; modern equipment throughout.

Cottages, Walton, Cal. Designer, Miss Lillian Tate, 414 O. T. Johnson building, Los Angeles. Owner, A. F. Johns. Miss Tate is preparing designs for six frame cottages, one of which will be used by Mrs. Johns for residence and will have hot air furnace.

Residence, Los Angeles. Architect, H. M. Patterson, 327 O. T. Johnson building, Los Angeles. Owner, Eugene Neff. The residence will be a one and one-half story frame building.

Office building, 343 W. Third street, Los Angeles. Architects, Dennis & Farwell, 301 Currier building, Los Angeles. Owner W. S. Collins, 701 O. T. Johnson building. A five-story office building will be erected on Third street, the material to be used for the building not yet definitely decided. It will be reinforced concrete or steel and brick.

School building, Berkeley. The plans for a new $50,000 school building at Berkeley, prepared by W. H. Wharff, have been rejected by the trustees and new plans will be called for. The bids exceeded the amount authorized by the trustees by several thousand dollars.

Three-story business block, Berkeley. Architect, A. H. Broad, Berkeley. Owner, J. W. Haven. Cost, $25,000. This building is to replace the one burned on Shattuck avenue two months ago. No contracts have been let yet. All the debris has been cleaned from the site and the excavating is under way.

Ten-story office building, Market street, San Francisco. Architect, William Helbing, Parrott building, San Francisco. Owner, William Helbing. Cost, $400,000. This building is to be class "A," fireproof, steel and brick, for stores and offices.

County and City Hospital, San Francisco. The board of supervisors of San Francisco have voted to build a new city and county hospital, and plans for the same will be prepared immediately by the city architects, Shea & Shea.

French flats, Burlingame. Architects, Wright & Polk, San Francisco. Owner's name withheld for present. Plans for a number of beautiful French and Italian flats to be built in Burlingame are being made in the office of Wright & Polk. They are to cost from $5,000 to $10,000.

Apartments, Fifteenth and Magnolia streets, Los Angeles. Architect, S. Tilden Norton, Los Angeles. Cost, $6,500. Owner, J. Korn. Contract just let for two frame apartment buildings, six and seven rooms.

Apartments, 10th and Valencia streets, Los Angeles. Architect, S. Tilden Norton, Los Angeles. Cost, $5,000. Owner, H. Q. Klein. Plans call for two six-room frame apartment buildings. The contracts are just let.

Depot, Los Angeles. Cost, $500,000. The Arcade depot of Los Angeles will be replaced by a Mission style structure for the use of both the Salt Lake and Southern Pacific railroads. Work is to be begun within the next thirty days.

Office building, Broadway, between Seventh and Eighth streets, Los Angeles. Architects, Morgan & Walls, 234 N. Main street, Los Angeles. Bids are now being figured and general contract will soon be let for the New Mark building, a brick and steel office building.

Morgan & Walls are also receiving bids for the elevators, marble and general inside work for the building for I. W. Hellman, corner of Fourth and Main streets. C. Leonardt is the general contractor.

Stone business block, Mountain View, Architects, Wolf & McKenzie, San Jose. Owner, George Swall, Mountain View. Cost, $7,000. Building will be two stories, sandstone front, three stores and offices; galvanized iron cornice; iron frame. Plans and specifications ready.

Alterations and addition to State Capitol, Sacramento. Architects, Sutton & Weeks, San Francisco. Engineers, Breite & Archer. Bids for the erection of the building are being received. The contracts are to be let in seven sections. The total cost of the improvements is estimated at $350,000. About 300 tons of iron and steel are to be used.

Remodeling Hughes Hotel, Fresno, Cal. Architects, McDougall Bros. Cost, $20,000. Work to consist of new dining rooms, office, palm court, grill, and remodeling entire second floor.

Residence, Fresno, Cal. Architect, E. Matheson. Cost, about $10,000. Plans are being made for a two-story, ten-room, classic style residence, to be built of concrete blocks. Mr. F. Osborn, owner.

School house, Red Bluff. Architects, Stone & Smith, Jas. Flood building, San Francisco. Cost, $27,000. Bids are now being taken for two-story and basement brick and stone building to contain ten rooms.

Bank building, Haywards. Architect, D. Franklin Oliver, 909 Jas. Flood building, San Francisco. Plans are being prepared in Mr. Oliver's office for a substantial three-story bank building to be erected by the bank at Haywards.

Postoffice building, Mountain View. Architects, Wolf & McKenzie, San Jose. Cost, $9,000. Owners, Rogers & Rogers, of Mountain View. Building is to be of brick with plaster, Mission style, two stories, one store and postoffice; offices on second floor. No contracts let yet.

Business building Grant avenue and Post street, San Francisco. Architect, Herman Barth, Montgomery street, San Francisco. Owner, I. Magnin & Co. Cost, $100,000. This building will be of sandstone and will be for the exclusive use of the owner. It will be six stories high. The size of the lot is 60x102 feet.

Freight sheds, San Francisco. Owner, Santa Fe railroad. Orders have been given to begin at once the erection of wharfs freight sheds and tracks on Kentucky street. There will be two immense freight sheds, each 1,200 feet long. Kentucky street will also be paved by the railroad company.

School, Piedmont avenue, Berkeley. Architect, F. D. Voorhees, 1111 James Flood building, San Francisco. Cost, $3,500. The building will be of brick and two stories, six rooms.

Grammar school, Selma, Cal. Architects, McDougall Bros., Fresno, Cal. Cost, $20,000. The plans now being completed call for two-story brick building containing six rooms and an assembly hall.

Business block, Kingsbury, Cal. Architect, E. Matheson. Owner, J. W. Curle. Cost, $4,000. Plans will call for two-story brick building. Date of opening bids not known.

Residence, Fresno, Cal., corner of F and Amador streets. Architect, E. Matheson. Cost, $6,500. Owner, Dr. Davidson.

Bank, Lindsey, Tulare Co., Cal. Architects, McDougal Bros., Fresno, Cal. Cost, $15,000. Contractor, C. J. Lindgren. Notice of building withheld till let. Plans call for a two-story brick building with basement. Second story to be used for offices. Building to have latest improved fixtures.

Residence, Visalia. Architect, E. Matheson. Owner, L. Lawrence. Cost, $4,000. The plans call for a two-story frame building.

Bank building, Sunnyvale. Architects, Wolf & McKenzie, San Jose. Cost, $6,000. Owners, Bank of Sunnyvale, W. E. Crossman, president. Plans have been finished and estimates are being taken on a two-story building to be either of cement blocks, brick or Mission style.

Residences, Bowdish and Haste streets, Berkeley. Architect, C. W. Cook, Oakland. Cost, $4,500 each. Owner, J. A. Marshall, Berkeley. Plans are being made for six modern houses of ten rooms each; three will be Mission style, plastered exterior and tile roofs, Mission oak furniture; others will be English half timber, oak beam finish interior.

Theater, Ellis street, San Francisco. Architects, O'Brien & Werner. Cost, $75,000. Owner, Marion Leventritt, San Francisco. Reference to this building was made in these reports several weeks ago. A number of architects presented plans, and those of O'Brien & Werner have just been accepted and bids will be taken at once. The front will be of sandstone and granite, the balance of steel and brick and absolutely fireproof. The building will cover a lot 72x137½ feet.

High school, Willets, Cal. Architects, Stone & Smith, Jas. Flood Building, San Francisco. Cost, $30,000. Bids are now being taken for this building.

* *

The Architects' Directory and Specification Index for 1905-1906 is at hand. The book contains a complete list of the architects of the United States and Canada, classified by states and towns, indicating those who are members of the American Institute of Architects; also the names of the officers and locations of the different architectural associations in the United States. The book has been prepared with the greatest care to secure accuracy both in names and locations. It also contains a complete list of the landscape and naval architects of the United States and Canada, indicating who are members of the American Society of Landscape Architects; also the Society of Naval Architects and Engineers. Published annually. Seventh edition. New York: William T. Comstock. One 8vo. vol.; red cloth, stamped in white. Price, $2 net.

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EDITORIAL

REINFORCED CONCRETE ON THE PACIFIC COAST.

The local increasing demands of the business world for reinforced concrete structures bespeaks a healthful condition of this material in the West. The Pacific Coast during the past season has seen commenced, and in some cases carried to completion, some of the largest concrete structures in existence in the United States.

The facility of reinforced concrete for supplying immediate demands, coupled with the economy nearly always obtained, commends its merits to the careful consideration of architects and engineers. To the investor one of its attractive features is the ability to place a structure in an earning condition on this Coast in much less time than can be done with other materials heretofore used.

Architects and engineers are rapidly becoming aware that there is a strong public feeling tending toward the building of permanent structures. They are learning that the professional man who can convince his clients he is able to give them such a structure usually finds little or no trouble in securing the required amount for the small additional first cost that may exist between it and the more perishable types. A proper presentation to the owner of actual costs, together with maintenance expenses that must accrue on less durable materials usually show the reinforced concrete to possess the greater economy.

The universal public expressions of confidence in the durability and strength of a completed concrete structure that always occur are most gratifying to the designer and tend to convince him that it is soon to become an inevitable popular demand.

The many smaller public demands that can be supplied in concrete will enable its merits to become so thoroughly understood that it will receive hearty support in quarters that have hitherto had but a meager knowledge of construction in other materials.

HOUSES FOR THE WORKING CLASSES.

The attempt to improve the conditions of the working classes in many of the larger cities of the country is strikingly illustrated in the model homes which are being erected in New York City through the munificence of Henry Phipps, who recently donated a million dollars for the purpose.

The plans for the first of the series of model tenements, which are considered far ahead of any previously constructed, have been prepared by Grosvenor Atterbury, an architect of some distinction, and call for three units, all being identical in style and architecture. The buildings will have a combined frontage of 180 feet and a depth of 98 feet 9 inches, while the height will be six stories and basement.

The total cost of the three houses which are first to be erected will be $225,000, and it is intended to have them completed and ready for occupancy as early in the present year as possible. The design embodies many novel innovations from an intellectual as well as a sociological standpoint. In connection with the former it may be stated that none of the apartments will open directly on the street, but the entrances to the tenements will be through two large archways, each of which will measure 32 feet in length, these leading into two interior courtyards arranged with plants and playing fountains.

The construction of the buildings is to be fireproof throughout, the materials comprising concrete, brick and steel. The apartments will be supplied with steam heat, hot and cold water, a gas range, washtub, sink and toilet or a shower or tub bath. In the basement of each of the buildings will be the boilers and heating appliances, hygienic laundry and drying rooms, storage rooms, children's playrooms, a kindergarten and a garbage incinerating plant, the purpose of the latter being to consume all the refuse from the different apartments as quickly as it can be carried to the furnace below.

The front portion of the roof will be equipped as a roof garden, where two permanent pavilions for shade and protection will be erected, while the rear portion of the roof will be devoted to the drying yards. The number of rooms alloted to each family will run from two and three to four and five apiece. Perhaps the most striking innovation in connection with these new model tenements will be the conspicuous absence of the janitor, who will be superseded by an intelligent and sympathetic matron selected by the trustees, and while practically taking the place of a janitor her duties will differ materially in that she will attend to all the affairs that may be called to her attention, as well as look after the sanitary condition of the buildings. The number of rentable rooms in the entire structure will be 207, arranged in 70 apartments, of which 25 are two-room suites, with toilet and shower bath; 27 are three-room suites, similarly equipped; 14 are four-room suites, with bathrooms containing toilets and tubs, and 4 are five-room suites, with bathrooms.

* *

THE ARCHITECTURAL LEAGUE OF AMERICA.

The San Francisco Architectural Club is the latest offspring of that national family of architectural clubs known as the Architectural League of America. This is the kind of news we are always glad to record, for it means that our local draughtsmen are making a strenuous effort toward improvement. It is to be hoped that Eastern ways and methods will soon invade our architects' workrooms. They seem to have a knack back there for turning out neat, accurate and complete working drawings.

The local club would appear to be on the right track. What they need now is encouragement, and it is up to the architects of San Francisco to furnish this to them.

On another page will be found two letters from the president of the Architectural League describing the scholarships in Harvard College and a traveling scholarship in Europe that the San Francisco Club members intend to compete for this year.

The Publisher's Corner

Residence of Mr. Henry Gervais *Designed and Built by the Owner* C-346

Vacuum Sweeping Plants for Private Residences.

Heretofore, in ~~order to~~ thoroughly clean carpets it was necessary either to have them taken up and sent to the beaters to have them beaten by hand, or to call in the services of the compressed air and vacuum cleaning wagons, which are now working throughout the United States.

The latter method is very satisfactory.

The Sanitary Devices Manufacturing Company of San Francisco, who manufacture these carpet-cleaning wagons, have now perfected and put on the market a vacuum Sweeping plant for residences.

This plant has been specially designed for economy in space and cheapness of operation.

By referring to the cut it will be seen that the motor, pump and dust tanks are self-contained on one base.

The cost of operation is about eight cents per hour, and in one hour's time 200 yards of carpet can be thoroughly cleaned.

Any person can operate this plant. All that is necessary is to turn on the electric current to start the motor.

An especially designed oiling system keeps the entire plant thoroughly lubricated for at least six (6) months without attention.

The wet and dry dust separating tanks thoroughly cleanse the air. The dry tank, by means of centrifugal motion and gravity, separates the heavier particles of dust, while the wet tank completes the process by passing the air current through the atomizer and a column of water, leaving the remaining matter in liquid suspension. The final removal of the dust is simple and sanitary—from the dry tank by a dumping trap-valve, and from the wet tank by drainage direct to the sewer.

The dimensions of this plant are: Length, 5 feet 2 inches; width, 3 feet 4 inches, and height, 6 feet 2 inches, so that there are few basements that have not space for this machinery.

All physicians now agree that most diseases are caused by germs. People should then realize how important it is to dispose of the dust that enters their homes and settles in their carpets and draperies.

Besides being sanitary, cleaning by vacuum process saves carpets from wear. It is not the travel on a carpet that causes it to wear out, but the grinding of sand and particles of dust into the fabric which act the same as sandpaper would on a rough surface.

Brooms appear to do good service, but examine the dust and dirt they collect and you will find that most of the dust has been driven into the carpet, and that what you remove consists of lint, very little dust and broom straw.

After sweeping, dusting is necessary. Dusting the furniture moves the dirt back to the carpets where it remains until again stirred up by the broom. The broom moves the dust to your pictures, furniture and hangings. The vacuum sweeper removes it and renders dusting unnecessary.

When sweeping by vacuum becomes universal, the percentage of sickness undoubtedly will decrease.

* *

The firm of John McGuigan & Co., whose card will be found elsewhere in this issue, are worthy of consideration on account of their long experience in the line of work they do.

We find them well-known and enjoying the confidence and patronage of many of the leading architects and contractors.

They are a progressive concern, not content with the single thought of the sufficiency of the present times, but are busy

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We learn that while they have many progressive ideas and are competent to make suggestions when requested, they make a main point in their business of adhering strictly to the specifications for, quoting them, "Specifications are made after mature consideration by the architect, and without question he knows what he wants."

✣ ✣

The San Gabriel Valley club house, drawings of which by Architects Hudson and Munsell are shown in this number, commands a picturesque sitting within sight of the historic San Gabriel mission. It is an ideal spot for an ideal country club house occupying as it does a commanding knoll in a reservation of 55 acres. Oak trees, cactus stockades, placed in position by the Indians in the early pioneer days, add to the attractiveness of the place. The golf links are unsurpassed anywhere in Southern California, while the tennis courts are the best that can be provided. A feature of the club house is the accommodations for baths, the Improved Climax Solar Water system being used.

✣ ✣

S. W. Marshall & Son of Fresno announce elsewhere in this number an exceptionally fine line of ornamental and fruit trees which doubtless will interest builders of new homes who may contemplate planting trees and shrubbery. The history of the Mr. Marshall's business dates back to 1888, when Mr. S. W. Marshall, the senior member of the firm, first launched out in the nursery business in Fresno. The firm carries a very complete line of fruit and ornamental trees, shrubs and vines, roses and general horticultural requisites, and visitors desiring to visit and inspect the stock are shown every courtesy.

The firm of Breite & Archer, structural engineers, with offices at 508 California street, has dissolved partnership, C. F. Archer retiring. Both young men are civil engineers of high standing on the Pacific Coast, and since entering the local field together have made many friends. Mr. W. W. Breite will continue the business of the firm, assuming all liabilities and assets.

✣ ✣

The San Francisco Architectural Club has elected officers for the year 1906 as follows: President, H. G. Corwin; vice-president, W. H. Crim, Jr.; treasurer, A. R. Johnson; secretary, M. A. Schmedlin.

Directors—Toby Beauwald, E. B. Scott, W. D. Sherman.

After election a general talk was indulged in, and as a result the club-rooms have been renovated and fitted up so that now they rival any in the country.

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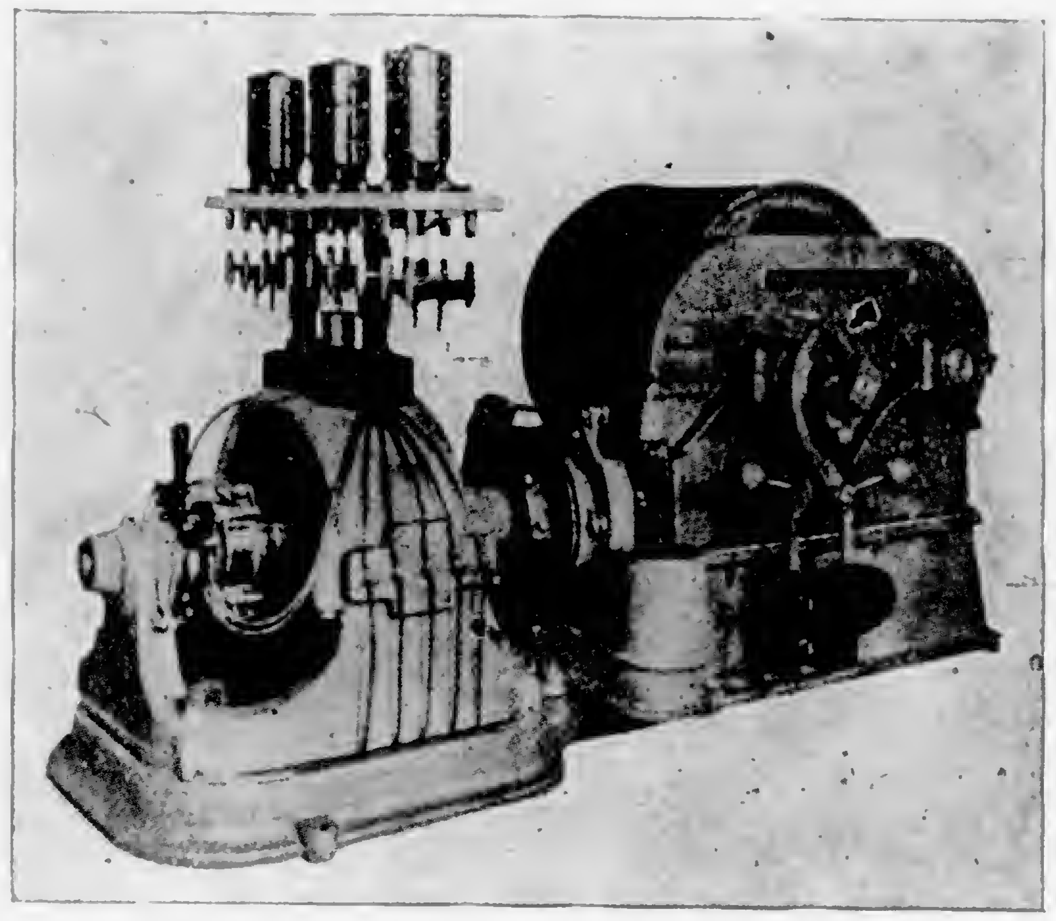

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The automatic sprinkling system installed on the Grand Opera House stage after the Iroquois fire in Chicago prevented what might have been a bad fire in the theater early yesterday morning. Watchman McAllister was making his rounds when he heard a hissing sound, and on the stage he found water trickling from the sprinkler.

On the left side of the stage he saw a tiny tongue of flame that became larger every moment. He turned in an alarm. The firemen arrived quickly, but before the first apparatus came the fire had spread to a pile of scenery that was banked on the left side of the stage. This scenery was fireproof, but it burned.

The more fire there was the better the automatic sprinkler worked. There was a sheet of water falling from it when the firemen arrived. Two alarms were rung in, for when the first firemen got to the theater it looked serious. The sprinkling apparatus did such good work, however, that the fire did not spread off the stage, and the only thing that was really damaged was about one-third of the scenery of "The Prodigal Son." —New York Sun.

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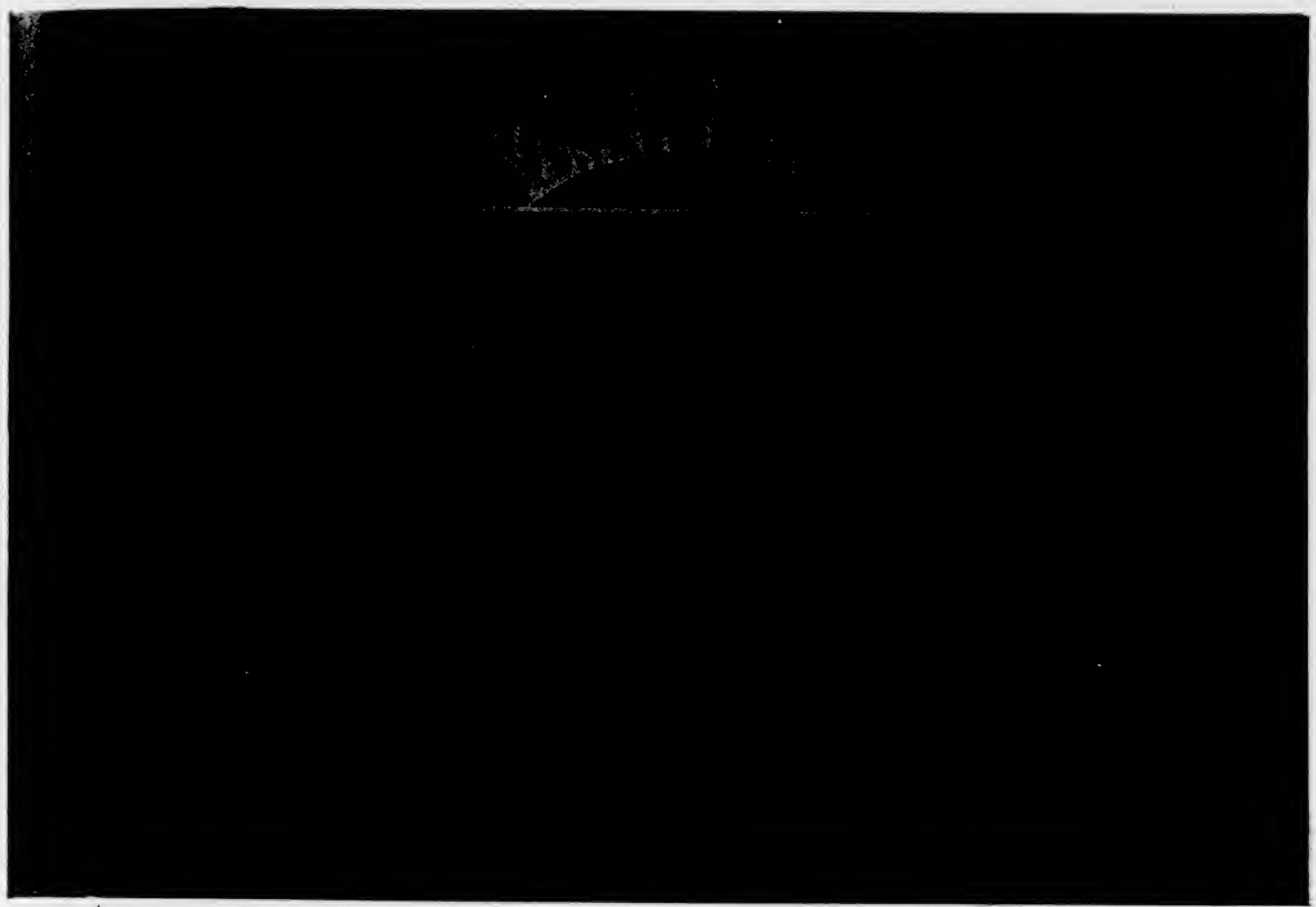

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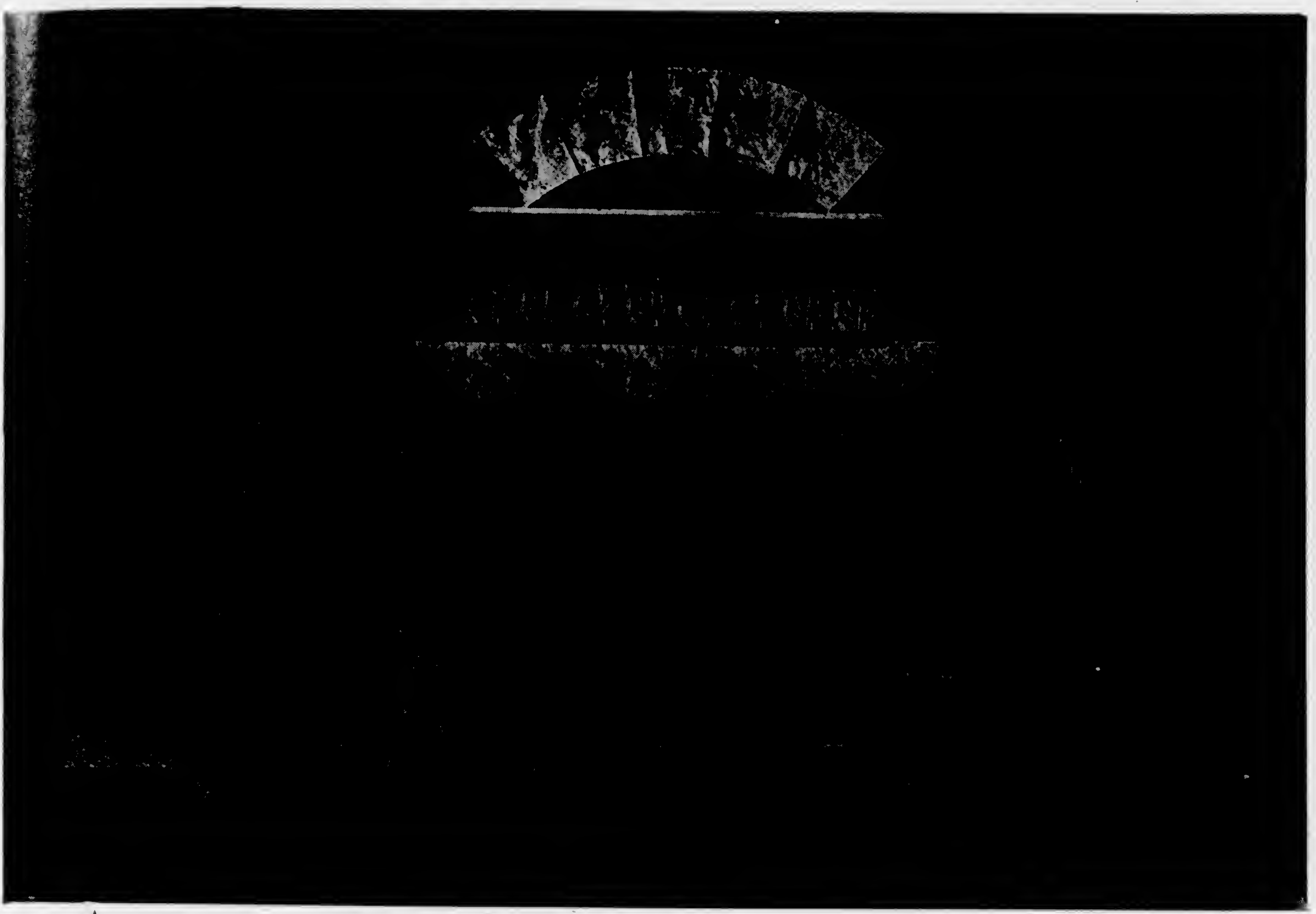

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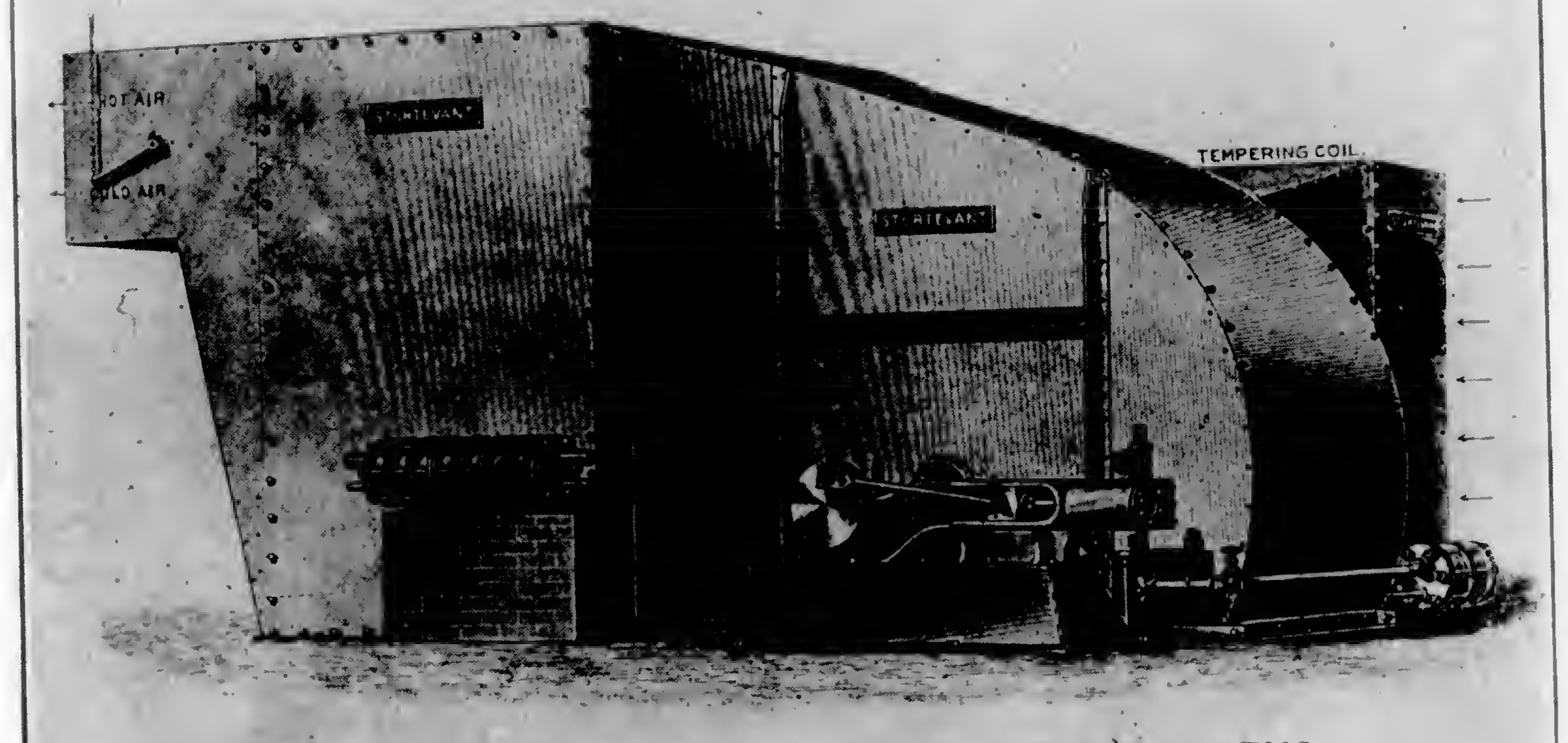

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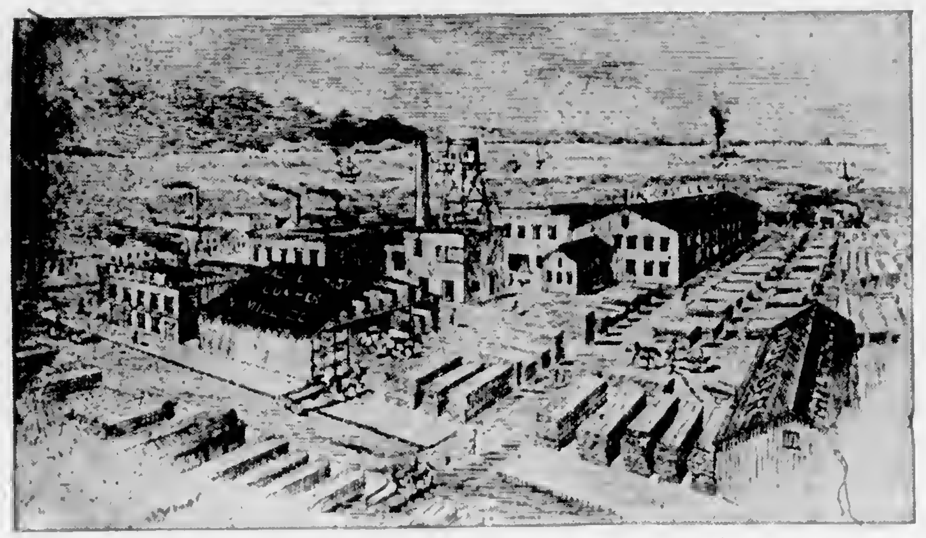
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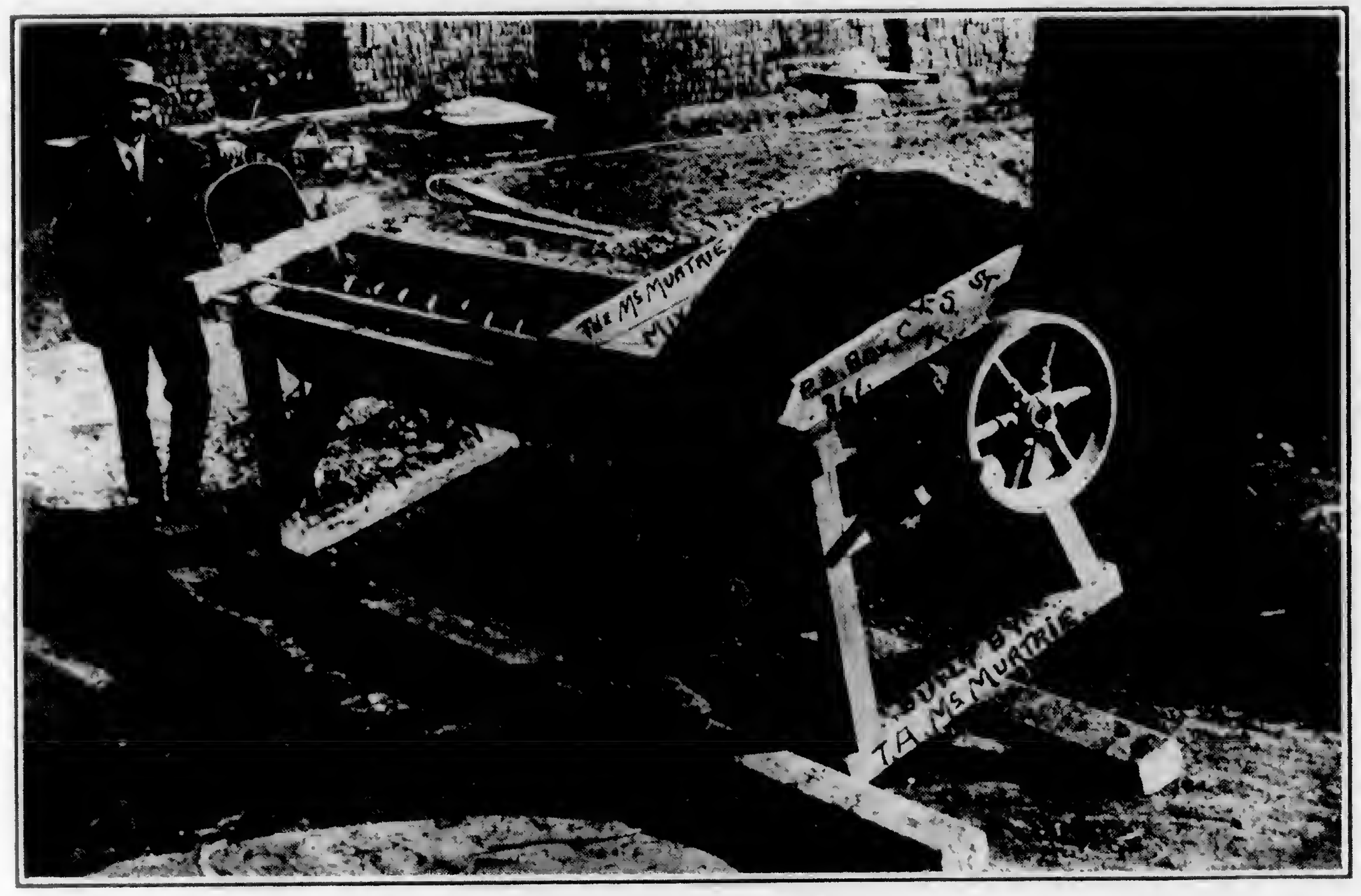

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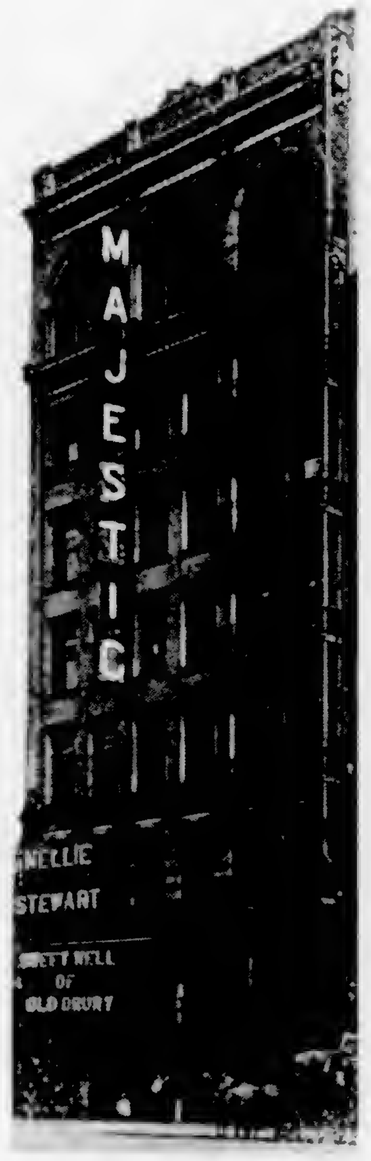

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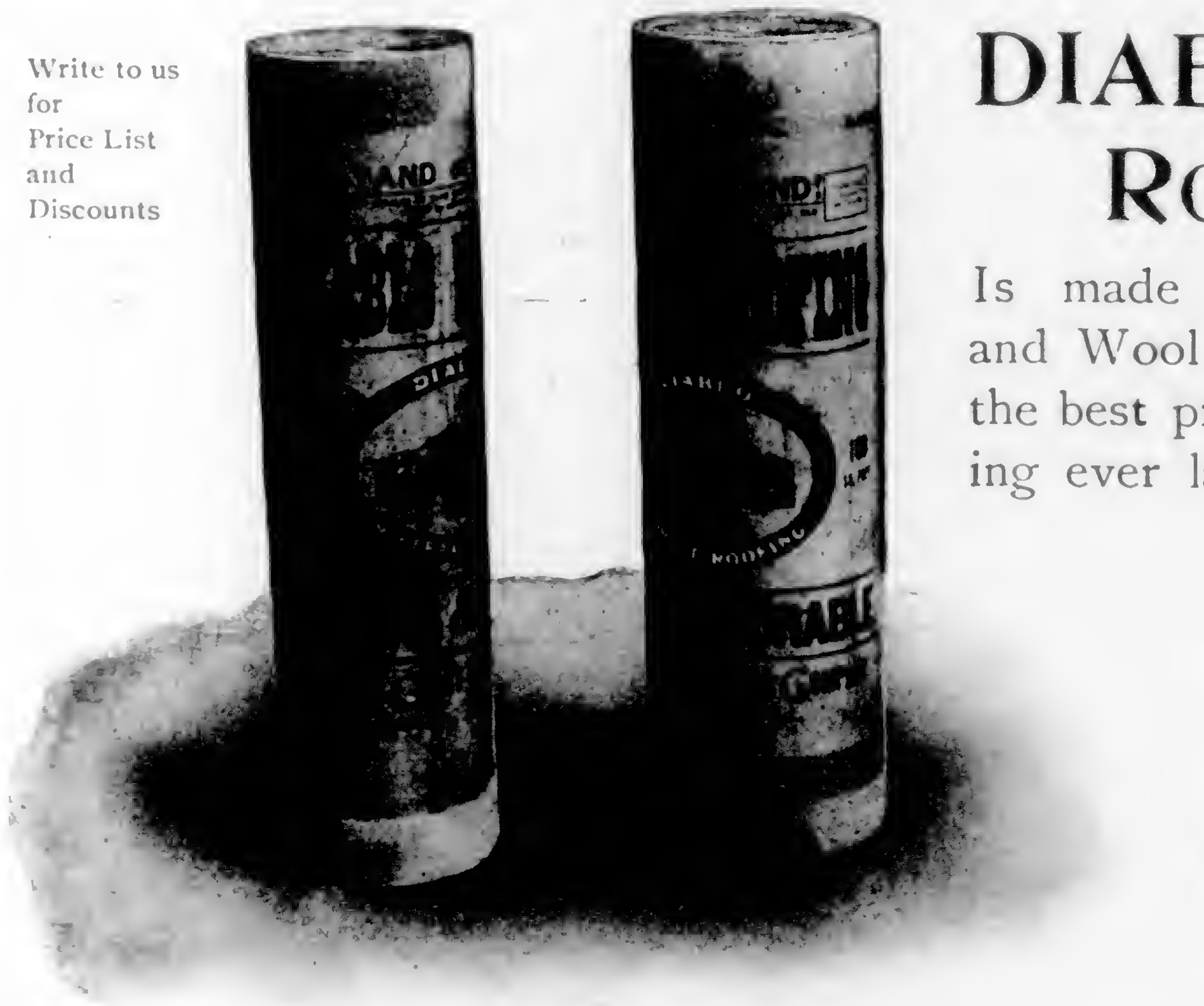

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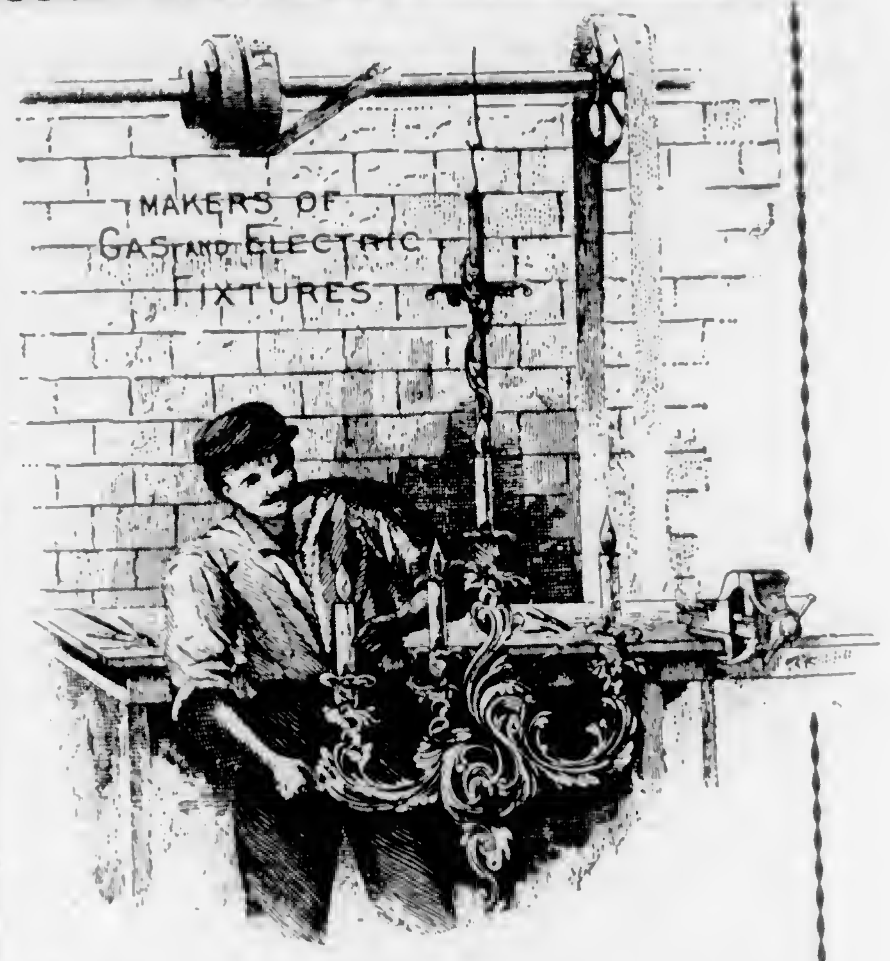

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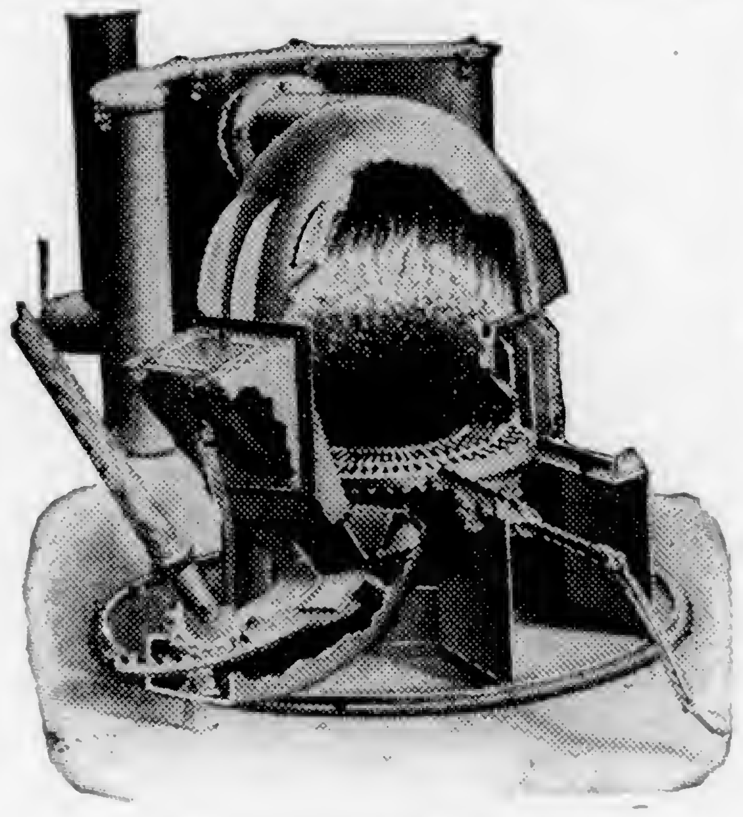

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INDEX TO ADVERTISERS

	Page
Alpine Plaster Co	103
Barnes, W. F	14
Bass Heuter Co	cov
Bay City Iron Works	10
Bayside Mfg. Co.	16
Benicia Iron Works	12
Breite, W. W	103
Brown & Co., H. E.	106
Burnett Iron Works, J. H	12
Cal Paint Co	101
Cal. Wood Fibre Plaster Co	3
Cal. Art Glass Works	15
Cal. Sheet Metal Works	6
Cal. Concrete B'ld'g Block Co	103
Carnegie Brick & Pottery Co	14
Cahill & Co., James	106
Colusa Sandstone Co	14
Central Iron Works	11
Couchot, Maurice C	71
Cowells & Simpson	102
Deasy Water Heater Co	1
Dunlevy & Gettle	103
Empire Plaster Co	9
Enos Co.	2
Furlong, Thomas	103
Gervais, Henry	86
Gilley & Co., F. A	111
Globe Engineering Co	106
Golden Gate Lawn Cement Co	103
Henshaw Bulkley Co	100
Hetty Bros	cov
Hipolito Screen & Sash Co	10
Hoegee & Co., Wm. H	74
Holmes Lime Co.	2
Hooper, Wm. W	82
Hough, E. D	106
Hoyt Bros	10
Ingerson & Glaser	1
Inlaid Floor Co	112
Johns-Manville Co	103
Kierulff, T. C	98
Klippert, J. E	106
Knickman & Nocenti	98
Larkin & Flaherty	5
Lindgren-Hicks Co	13
Leonard, John B	8
Lewis, Clayton	74
Llewellyn Co., The J	8
Manetta, J. E	102
Marshall, S. W	111
McGuigan, John	2
McMurtrie, T. A	102
Moffatt Co., H. W	6
Montague & Co., W. W	3
Nephi Plaster Co	108
Nickel, Karl H	105
Occidental Mach'y & Eng. Co	cov
Otis Elevator Co	7
Pacific Coast Art Marble Co	15
Pacific Coast L'mb'r & Mill Co.	101
Pacific Coast Paper Co	108
Pacific Concrete Bl'k & M'ch.Co	99
Pacific Distributing Co	5
Pacific H'ting & V'ntilating Co.	15
Pacific Mfg. Co	109
Pacific-Portland Cement Co	cov
Pacific Refining & Roofing Co	101
Pacific Stone Co	109
Pacific Fire Extinguishing Co	87
Pacific Type Writer Co	104
Paraffine Paint Co	97
Pennsylvania Steel Co., The	11
Phoenix Iron Works	12
Pierce Hardware Co	4
Pioneer Roll Paper Co	10
Ralston Iron Works	11
Richter Mfg. Co.	104
Reilly, J. F. & Co., Laundry Trays	6
Rio Grande R. R	110
Roberts Mfg. Co	109
Roberts Water Heater Co	16
Roebling's Sons Co	cov
Ross McMahon Awning Co	2
Sampson Spot Cord	111
Sanitary Devices Mfg. Co	cov
Sartorius Company	12
S. F. Artificial Stone Paving Co	9
Solar Heater Co	cov
Standard Iron Works	104
Stansfield, Wm	106
Stieger Terra Cotta and Pottery Works	4
Sunset Lumber Co	10
Sunset Magazine	110
Tamm & Nolan Co	16
Tolchard, W. F	108
Tozer & Son Co., L	9
Tucker, W. W	104
Underwood Bldg Bl'k Mach.Co	8
Union Lime Co	101
Valley Artificial Stone & Cement Works	2
Van Emon Engineering Co	97
Waltz Safe & Lock Co	6
Westcott Paint Co	98
Western Builders' Supply Co	4
Western Exp. Metal Co	106
Western Inspection Bureau	5
Western Fuel Co	107
Western Iron Works	11
Winsor Cal. Pottery Works	103
Worswick Street Paving Co	110
X'olith Mfg. Co	106
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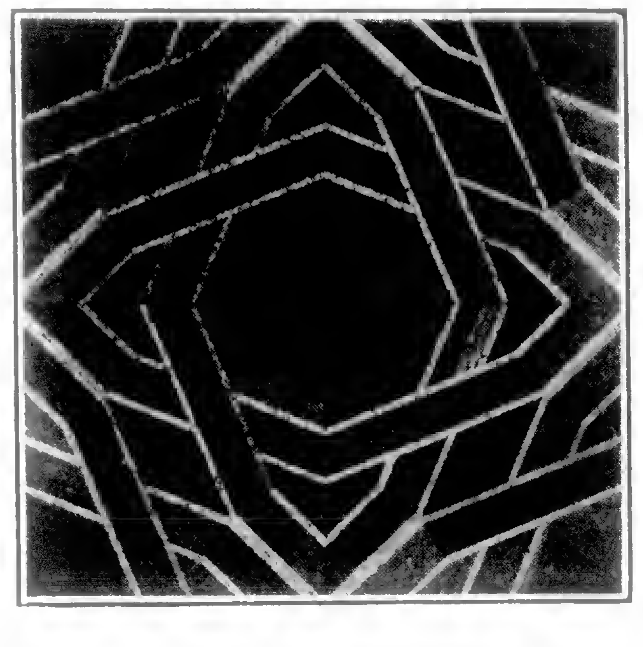

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INDEX TO ADVERTISERS

Page
Alpine Plaster Co 103

Barnes, W. F 14
Bass Heuter Co .... cov
Bay City Iron Works 10
Bayside Mfg. Co 16
Benicia Iron Works 12
Breite, W. W 103
Brown & Co., H. E 106
Burnett Iron Works, J. H 12

Cal. Paint Co 101
Cal. Wood Fibre Plaster Co 3
Cal. Art Glass Works 15
Cal. Sheet Metal Works 6
Cal. Concrete B'ld'g Block Co 103
Carnegie Brick & Pottery Co 14
Cahill & Co., James 106
Colusa Sandstone Co 14
Central Iron Works 11
Couchot, Maurice C 71
Cowells & Simpson 102

Deasy Water Heater Co 1
Dunlevy & Gettle 103

Empire Plaster Co 9
Enos Co 2

Furlong, Thomas 103

Gervais, Henry 86
Gilley & Co., F. A 111
Globe Engineering Co 106
Golden Gate Lawn Cement Co 103

Henshaw Bulkley Co 100
Hetty Bros .... cov
Hipolito Screen & Sash Co 10
Hoegee & Co., Wm. H 74
Holmes Lime Co 2
Hooper, Wm. W 82
Hough, E. D 106
Hoyt Bros 10

Page
Ingerson & Glaser 1
Inlaid Floor Co 112

Johns-Manville Co 103

Kierulff, T. C 98
Klippert, J. E 106
Knickman & Nocenti 98

Larkin & Flaherty 5
Lindgren-Hicks Co 13
Leonard, John B 8
Lewis, Clayton 74
Llewellyn Co., The J 8

Manetta, J. E 102
Marshall, S. W 111
McGuigan, John 2
McMurtrie, T. A 102
Moffatt Co., H. W 6
Montague & Co., W. W 3

Nephi Plaster Co 108
Nickel, Karl H 105

Occidental Mach'y & Eng. Co .... cov
Otis Elevator Co 7

Pacific Coast Art Marble Co 15
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Pacific Mfg. Co 109
Pacific-Portland Cement Co .... cov
Pacific Refining & Roofing Co 101
Pacific Stone Co 109
Pacific Fire Extinguishing Co 87
Pacific Type Writer Co 104
Paraffine Paint Co 97
Pennsylvania Steel Co., The 11
Phoenix Iron Works 12
Pierce Hardware Co 1
Pioneer Roll Paper Co 10

Page
Ralston Iron Works 11
Richter Mfg. Co 104
Reilly, J. F. & Co., Laundry Trays 6
Rio Grande R. R 110
Roberts Mfg. Co 109
Roberts Water Heater Co 16
Roebling's Sons Co .... cov
Ross McMahon Awning Co 2

Sampson Spot Cord 111
Sanitary Devices Mfg. Co .... cov
Sartorius Company 12
S. F. Artificial Stone Paving Co 9
Solar Heater Co .... cov
Standard Iron Works 104
Stansfield, Wm 106
Stieger Terra Cotta and Pottery Works 4
Sunset Lumber Co 10
Sunset Magazine 110

Tamm & Nolan Co 16
Tolchard, W. F 108
Tozer & Son Co., L 9
Tucker, W. W 104

Underwood Bldg Bl'k Mach.Co 8
Union Lime Co 101

Valley Artificial Stone & Cement Works 2
Van Emon Engineering Co 97

Waltz Safe & Lock Co 6
Westcott Paint Co 98
Western Builders' Supply Co 4
Western Exp. Metal Co 106
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Winsor Cal. Pottery Works 103
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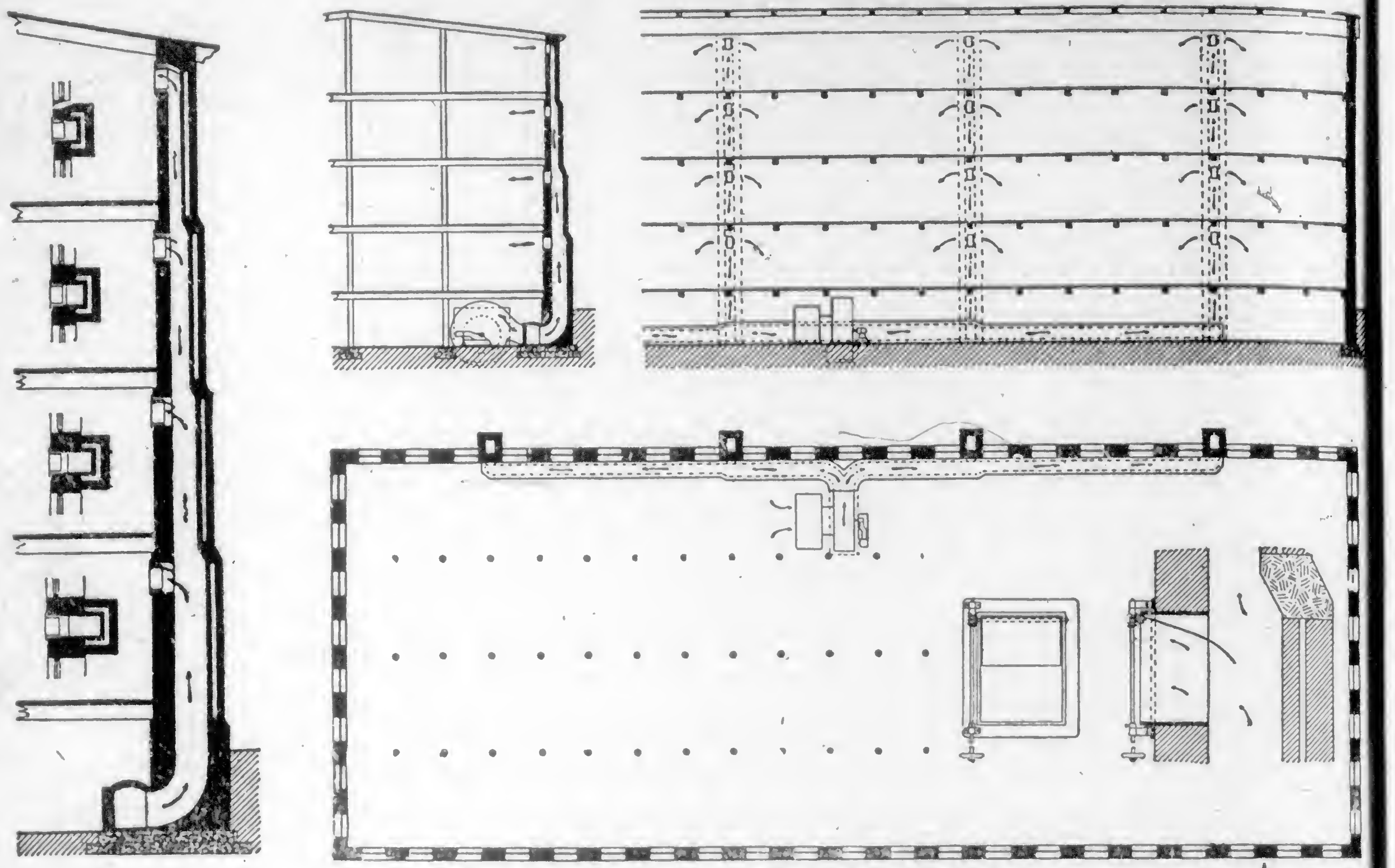

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Contents for March

Frontispiece—*Charles F. Whittlesey, Architect*
California's Largest Reinforced Concrete Building - - - - - - - 19
Steel Construction—*W. W. Breite, C. E.* - - - - - - - - - 30
Fire Proofing and Insurance—*Edward T. Cairns* - - - - - - - - 35
Arts and Crafts of Los Angeles - - - - - - - - - - 41
Building and Designing the Skyscraper—*Edward S. Mammatt, Architect* - - 43
American Society of Civil Engineers - - - - - - - - - 46
San Diego's New Hotel - - - - - - - - - - - - 49

CEMENT AND CONCRETE—

The Reno Reinforced Concrete Bridge - - - - - - - - 53
Steel for Reinforcements—*A. L. Johnson, C. E.* - - - - - - 58
Cost of Laying Concrete Blocks - - - - - - - - - 62

BRICK AND TERRA COTTA—

Brick Making on the Pacific Coast - - - - - - - - - 63

HEATING, LIGHTING AND ELECTRICAL WORK—

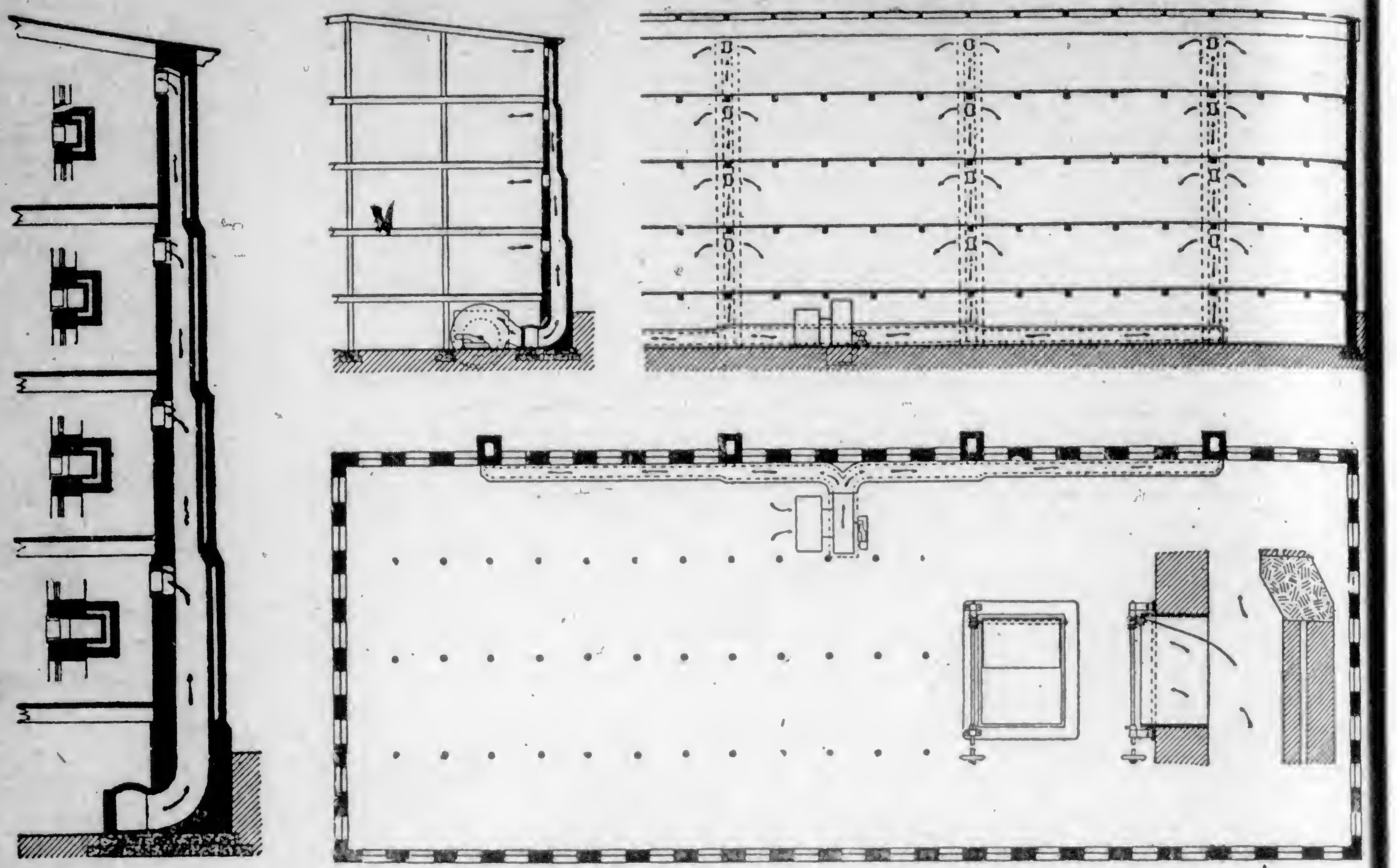
Lighting Fixtures—*John C. English* - - - - - - - - 65
Architectural League of America - - - - - - - - - 66
Electric Wiring of Buildings - - - - - - - - - - 67
Amount of Air Required for Ventilation—*F. H. Bryant* - - - - - - 69
Uncle Sam an Art Patron - - - - - - - - - - - 71
Lessons of the First Heavy Storms—*Harry Larkin* - - - - - - - 72
Houses of All Glass - - - - - - - - - - - - 73
Notes from the San Francisco Architectural Club - - - - - - - 74
Small Beginnings of Rich and Famous Americans - - - - - - - 75
Annual Banquet of the San Francisco Builders' Exchange - - - - - 76
A New Tax on Architects - - - - - - - - - - - 77

INTERIOR DECORATION—

Dining Rooms—Overdone and Underdone—*C. Walter Tozer* - - - - 79
AMONG THE ARCHITECTS - - - - - - - - - - - - 82

EDITORIAL—

An Unsatisfactory Ordinance—*F. W. Jones* - - - - - - - - 84
Glass Houses Are Coming - - - - - - - - - - 85
Competitions—*Charles Peter Weeks* - - - - - - - - - 85
THE PUBLISHER'S CORNER - - - - - - - - - - - 87



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Contents for March

Frontispiece—*Charles F. Whittlesey, Architect*
California's Largest Reinforced Concrete Building - - - - - - - 19
Steel Construction—*W. W. Breite, C. E.* - - - - - - - - - - 30
Fire Proofing and Insurance—*Edward T. Cairns* - - - - - - - - 35
Arts and Crafts of Los Angeles - - - - - - - - - - - - 41
Building and Designing the Skyscraper—*Edward S. Mammatt, Architect* - - 43
American Society of Civil Engineers - - - - - - - - - - 46
San Diego's New Hotel - - - - - - - - - - - - - - 49

CEMENT AND CONCRETE—

The Reno Reinforced Concrete Bridge - - - - - - - - - - 53
Steel for Reinforcements—*A. L. Johnson, C. E.* - - - - - - - - 58
Cost of Laying Concrete Blocks - - - - - - - - - - - 62

BRICK AND TERRA COTTA—

Brick Making on the Pacific Coast - - - - - - - - - - 63

HEATING, LIGHTING AND ELECTRICAL WORK—

Lighting Fixtures—*John C. English* - - - - - - - - - - 65
Architectural League of America - - - - - - - - - - - 66
Electric Wiring of Buildings - - - - - - - - - - - - 67
Amount of Air Required for Ventilation—*F. H. Bryant* - - - - - - 69
Uncle Sam an Art Patron - - - - - - - - - - - - - 71
Lessons of the First Heavy Storms—*Harry Larkin* - - - - - - - 72
Houses of All Glass - - - - - - - - - - - - - - - 73
Notes from the San Francisco Architectural Club - - - - - - - 74
Small Beginnings of Rich and Famous Americans - - - - - - - 75
Annual Banquet of the San Francisco Builders' Exchange - - - - - 76
A New Tax on Architects - - - - - - - - - - - - - 77

INTERIOR DECORATION—

Dining Rooms—Overdone and Underdone—*C. Walter Tozer* - - - - 79
AMONG THE ARCHITECTS - - - - - - - - - - - - - - 82

EDITORIAL—

An Unsatisfactory Ordinance—*F. W. Jones* - - - - - - - - 84
Glass Houses Are Coming - - - - - - - - - - - - - 85
Competitions—*Charles Peter Weeks* - - - - - - - - - - 85
THE PUBLISHER'S CORNER - - - - - - - - - - - - - 87

Charles F. Whittlesey, Architect

The Architect and Engineer

Of California

VOL. IV — MARCH, 1906. — NO. 2

California's Largest Reinforced Concrete Building

CHAS. F. WHITTLESEY, Architect

THE Auditorium at Los Angeles has been under construction for about six months, and will be completed July 1st of this year. It occupies the site of the old Hazard's Pavilion, facing Central Park, on the corner of Fifth and Olive Streets.

The structure is of reinforced concrete from foundation to roof inclusive, and is probably, in some respects, the most remarkable building ever erected of this material.

The building measures 165 feet on Fifth street and 175 feet on Olive. The portion on Fifth Street, 165 x 65 feet, facing the park, is to be used for an office building for physicians and dentists above the third story. The central section will be nine stories high.

In the middle of the Fifth street facade is the main entrance to the Auditorium. This entrance is 42 feet wide and leads through the office building to the Auditorium, with a large lobby, ticket offices, elevators, etc.

There is a stage entrance 10 feet wide at the east end of the Fifth-street facade.

The remainder of the first story of the office building is divided into six stores.

In the basement is a cafe and banquet hall with seats for nearly 800, with commodious kitchen accommodations, below which, in the sub-basement, is an engine and machine room of generous proportions, in which will be installed a complete lighting and power plant.

On the second and third floors of the office building is a small choral hall with a balcony, having a seating capacity of 800 and a complete stage equipment. There are also on these floors a lecture hall with balcony, having a seating capacity of 1,000.

The second and third stories also contain the quarters for the Temple Baptist Church, of which Rev. Robert J. Burdette is pastor, consisting of social rooms, parlors, Sunday-school and primary school rooms, library, pastor's study, committee and trustees' rooms and a creche or nursery, where infants can be cared for while their parents attend church.

Under the steep roofs of the office building there are large rooms with high ceilings, for art studios, photographers and lodge halls.

The main auditorium, in which the chief interest centers, covers with its stage an area of 165 x 110 feet, and is the largest theatre west of Chicago. Its normal seating capacity is 3,500, with provision for seating 5,000 for special conventions, etc.

There is a broad foyer extending all around the audience room, with twelve pairs of wide doors leading out onto Olive street and connected also

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1-19 [illegible]
P. 19

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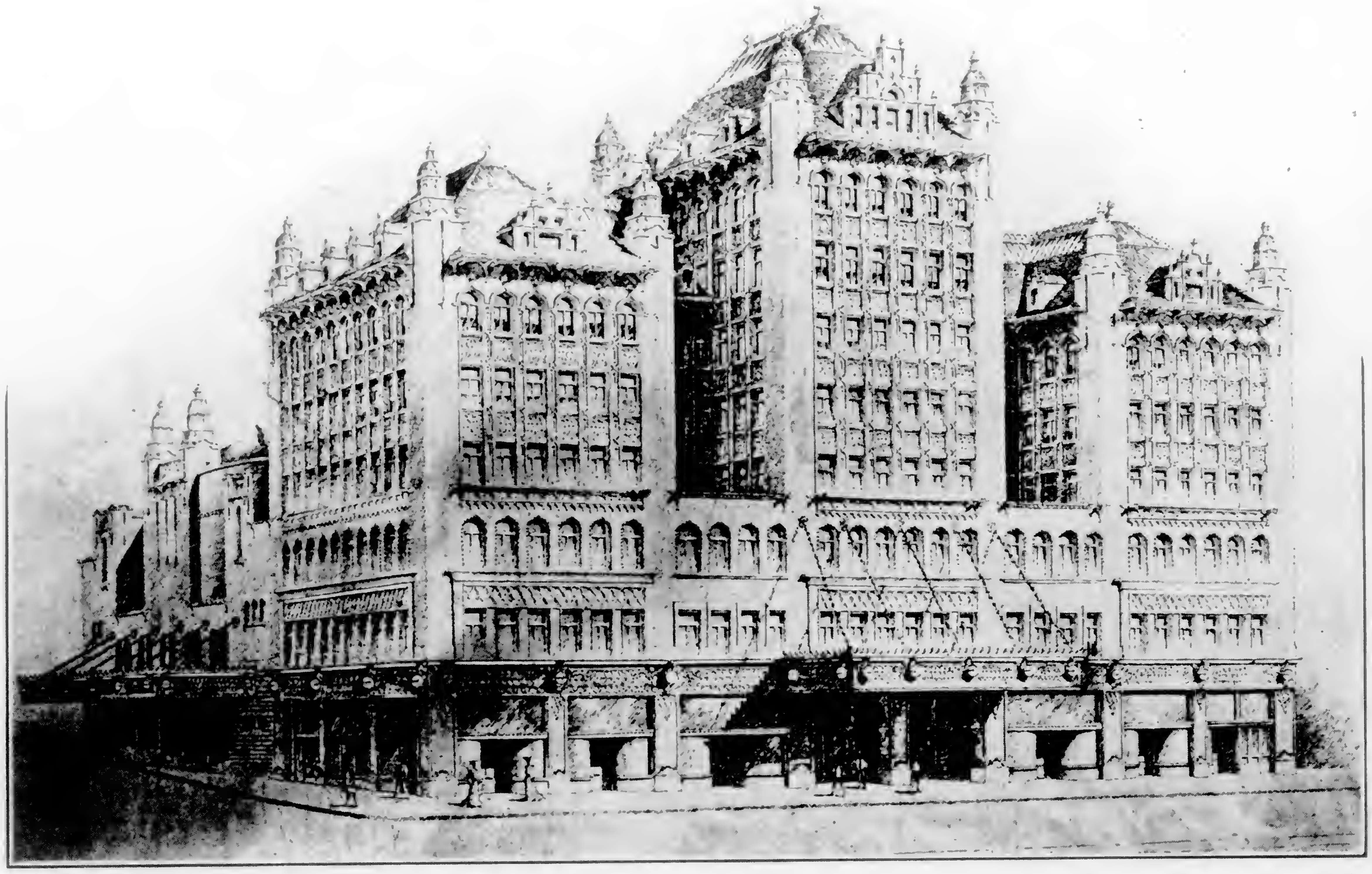
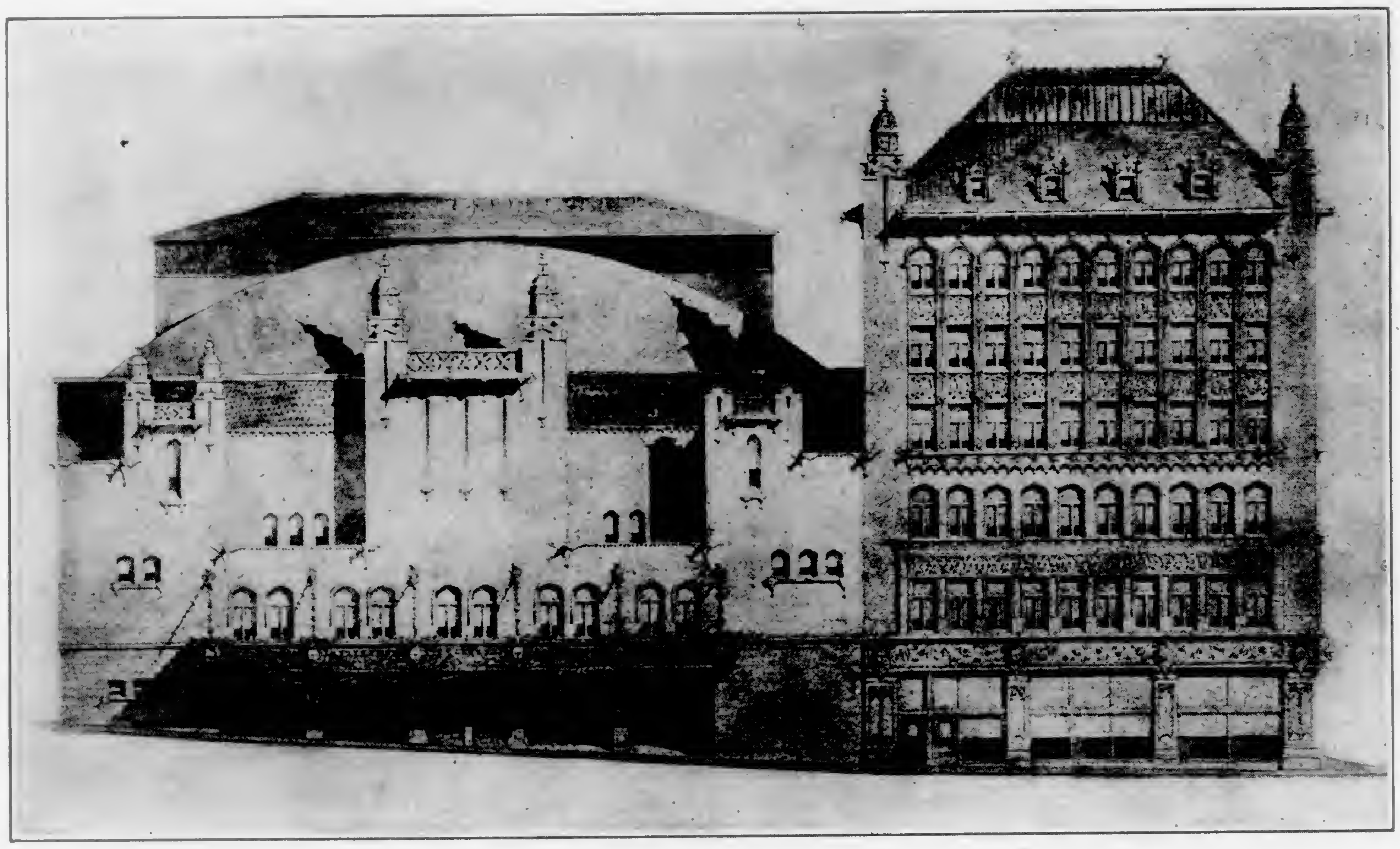
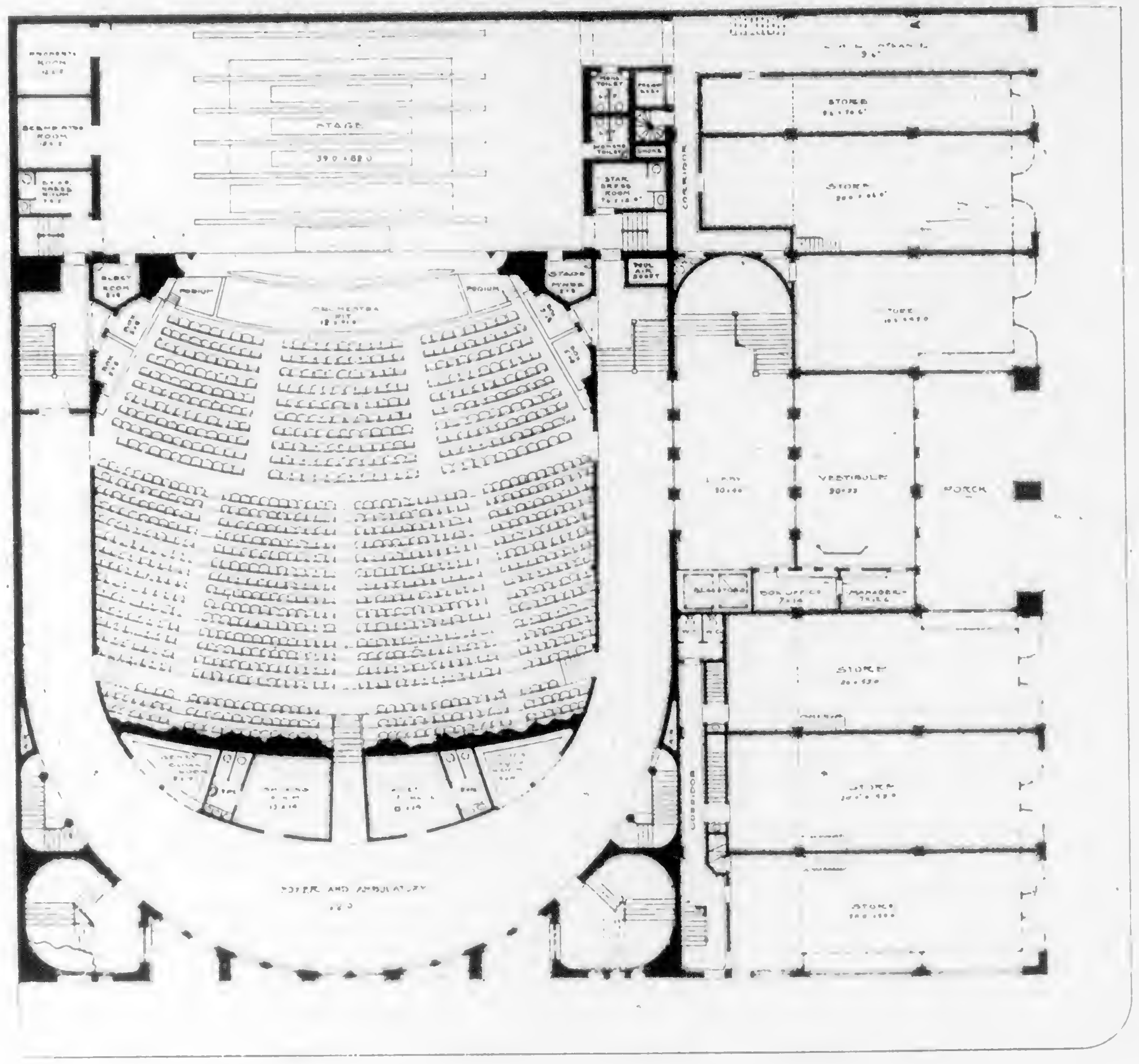


Auditorium of Reinforced Concrete, Los Angeles,
Charles F. Whittlesey, Architect

John B. Leonard, Consulting Engineer



Elevation on Olive Street showing Auditorium



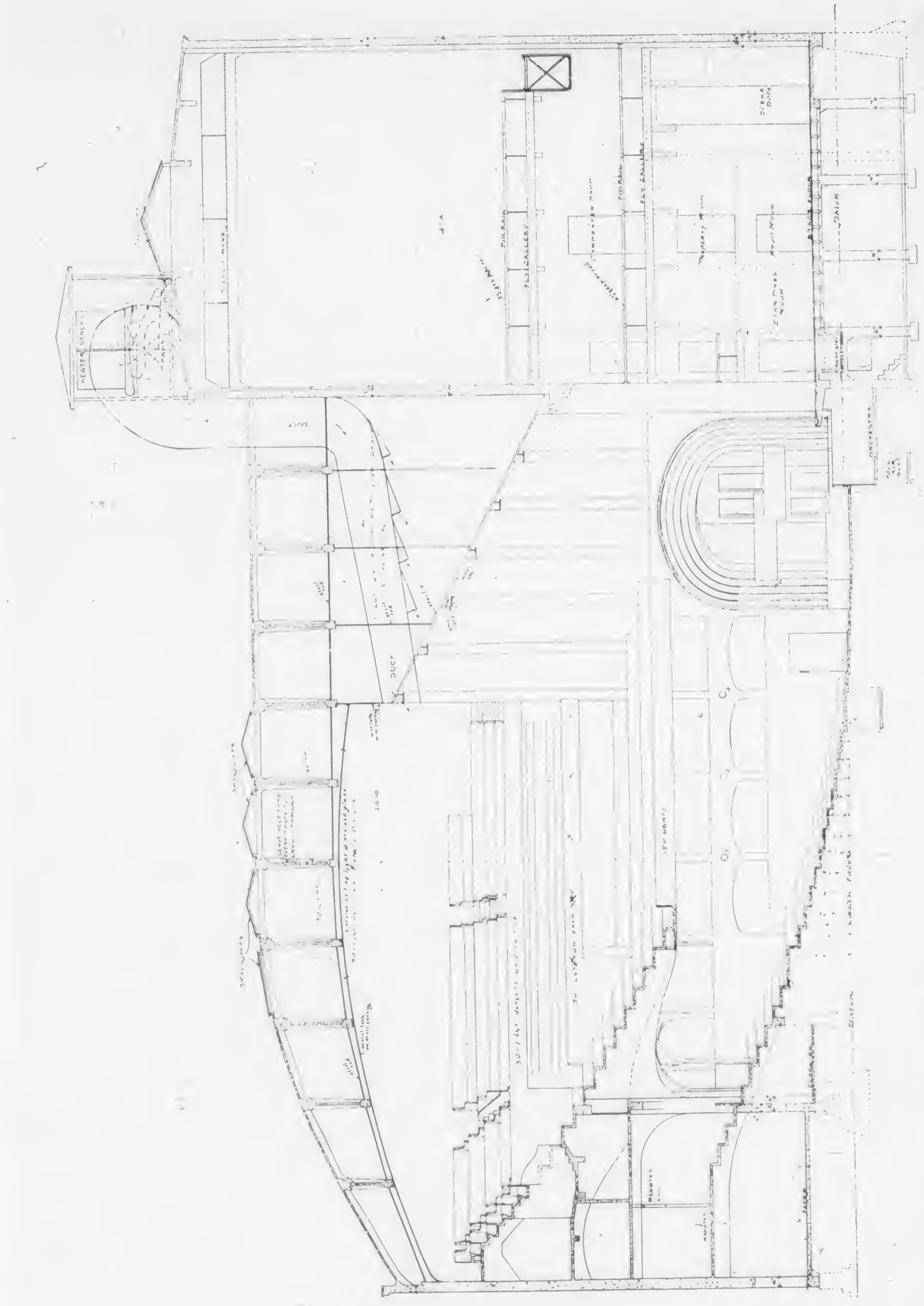
First Floor Plan, Auditorium C-351

with the main entrance lobby on Fifth street. The isacoustic curve of the seatings in the main floor of the body of the house rises at the rear to such a height that the seatings cover entirely the main foyer. There is an enormous balcony which splits up on both sides into shallow galleries in four tiers, each of which merges into the main balcony without a break in the rows of seats.

This balcony is carried on great cantilevers of reinforced concrete so that there are no columns in the floor below to obstruct the view from the seats under the balcony. The great height of this balcony admits of two stories of foyer for the balcony under the seats. These foyers are accessible to the balcony through vomitoria, such as were used in the ancient Coliseum at Rome; so that it is not necessary to climb to the rear of the balcony and then descend to the seats in the front rows.

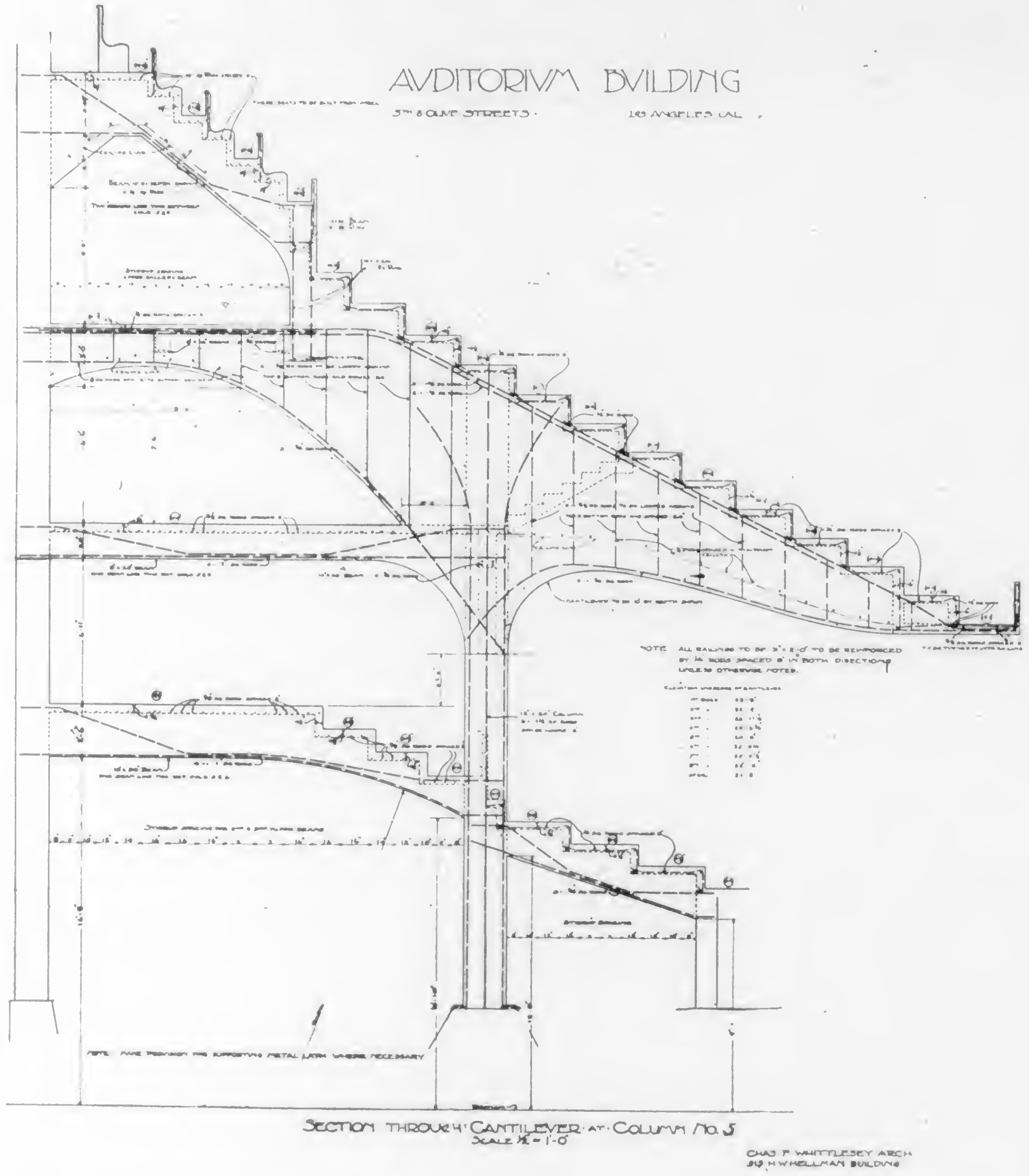
The roof over the auditorium will be entirely of reinforced concrete, carried on trusses of the same material, having a clear span of 110 feet. These trusses are ten feet apart. The vibratory strain on the roof, due to the tones from the immense organ, which will be installed over the proscenium arch, is a factor which it is necessary to consider in the calculations for strength.

The unusual size of this room and its stage makes the question of acoustics very difficult. The farthest seats are much beyond the ordinary range of the human voice, and therefore the sound waves are assisted by the air currents of the ventilating system. The air is blown in around and over



C-352

Longitudinal Section through Auditorium



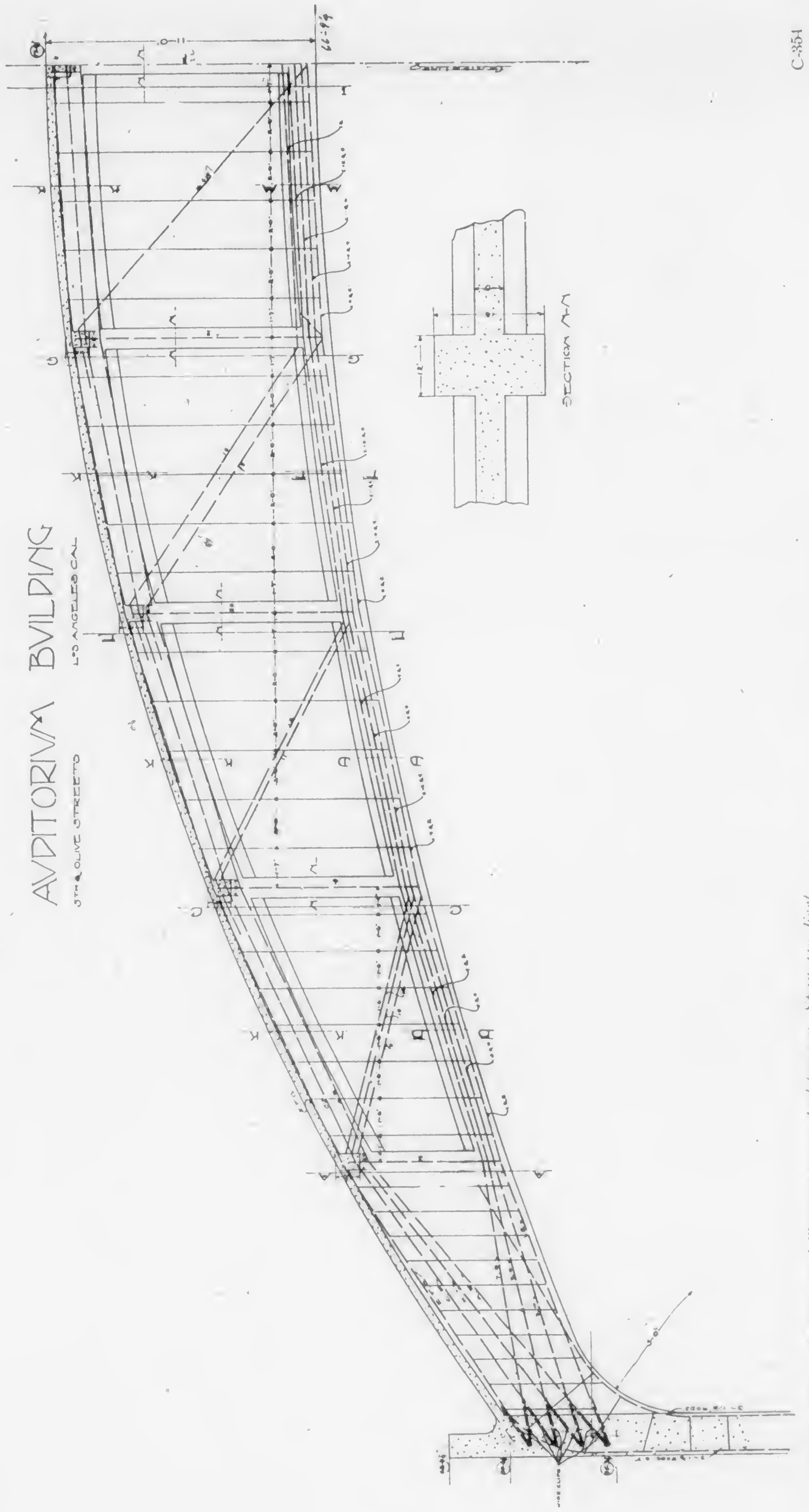
Section Through Main Balcony in Auditorium C-353

the proscenium arch and exhausted around the side and rear walls of the auditorium and through the floor.

The ventilating system is arranged to reverse in case of fire, so that the smoke will be exhausted at the ceiling and the fresh air driven in at the floor and near the exits.

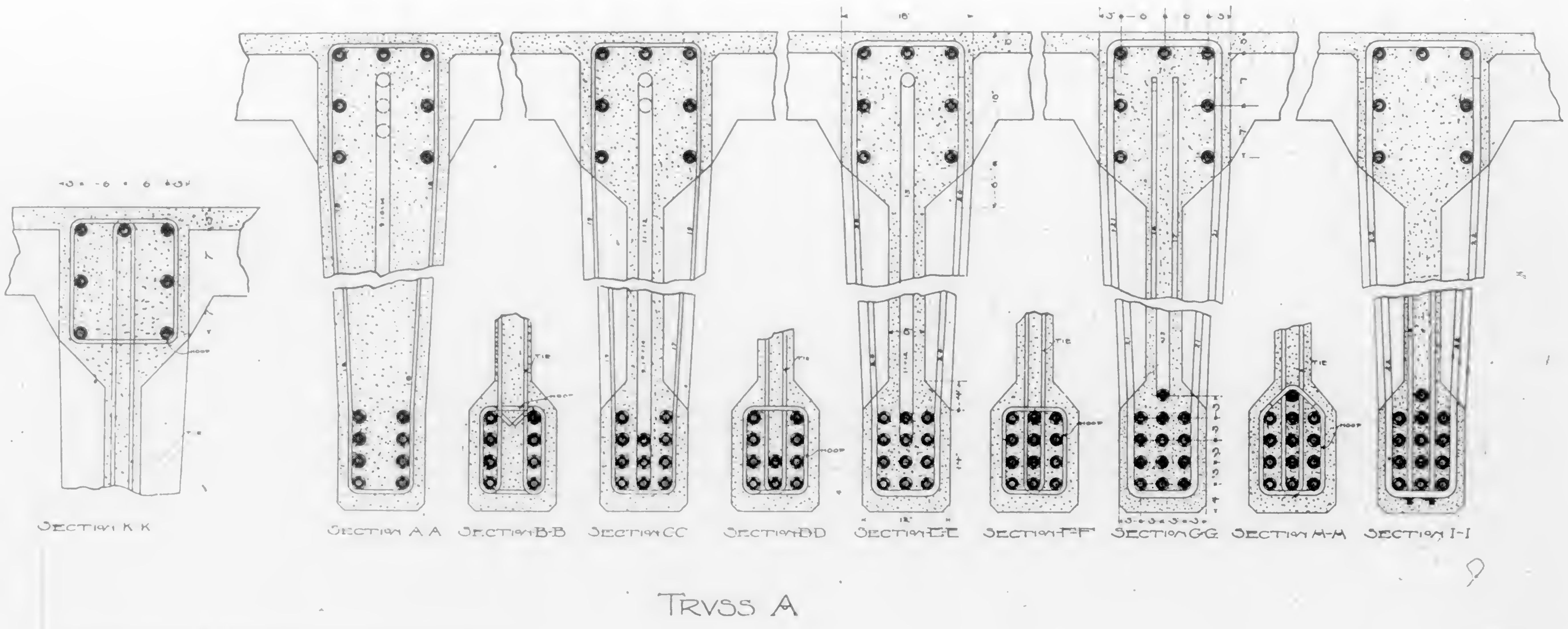
The stairways and exits are so distributed that the entire house can be emptied quickly without congestion.

The writer employed Jno. B Leonard of San Francisco as engineer, and to him were referred the problems involved in fabricating the design of the architect in reinforced concrete, in accordance with the plans submitted in the competitive sketches. Mr. J. G. Rae has been the engineer in charge of the work in the field.

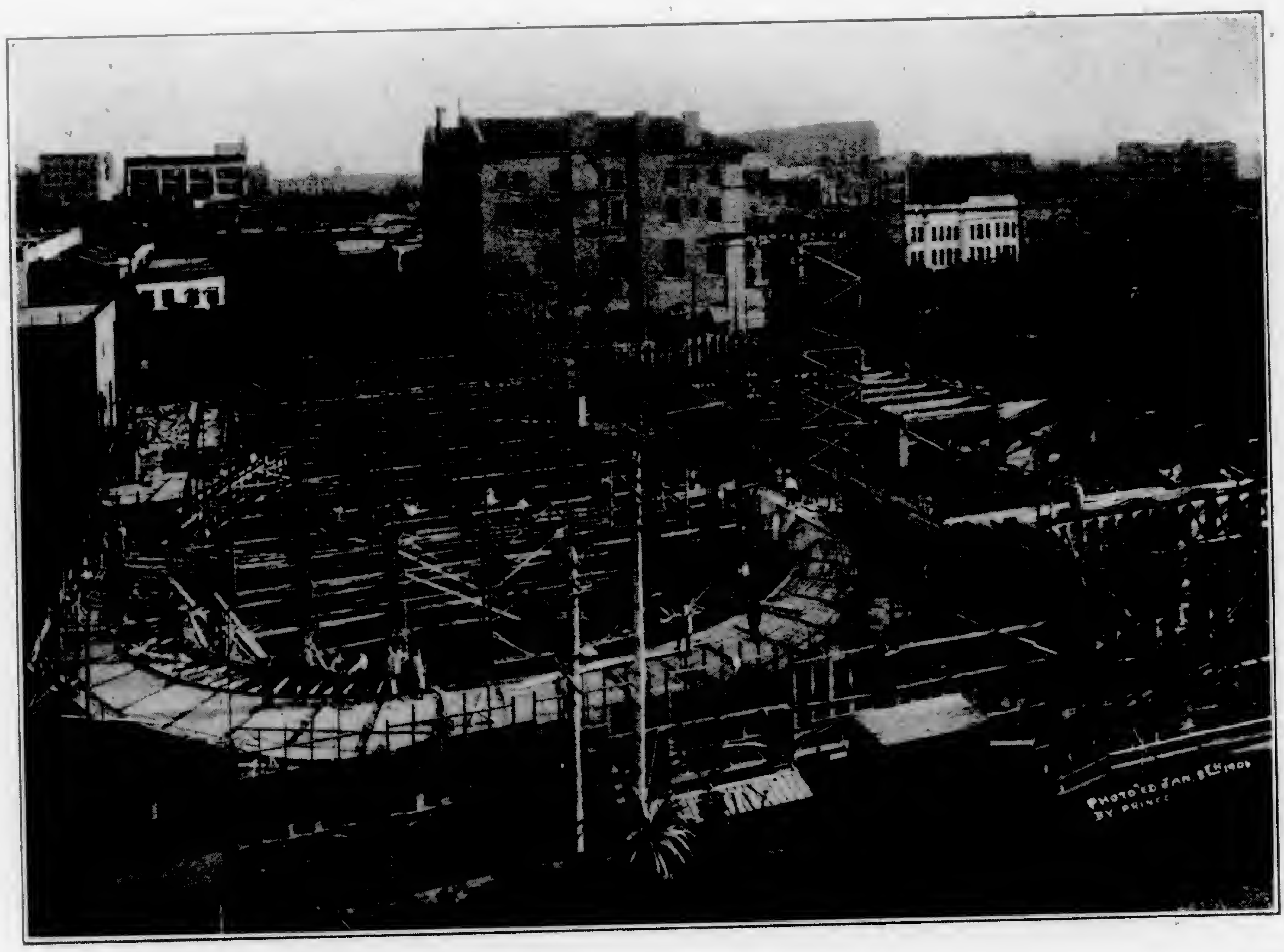


Half Section of Main Roof Trusses over Auditorium, Span 110 Feet
(EDITOR'S NOTE—End connection changed to pin bearing.)

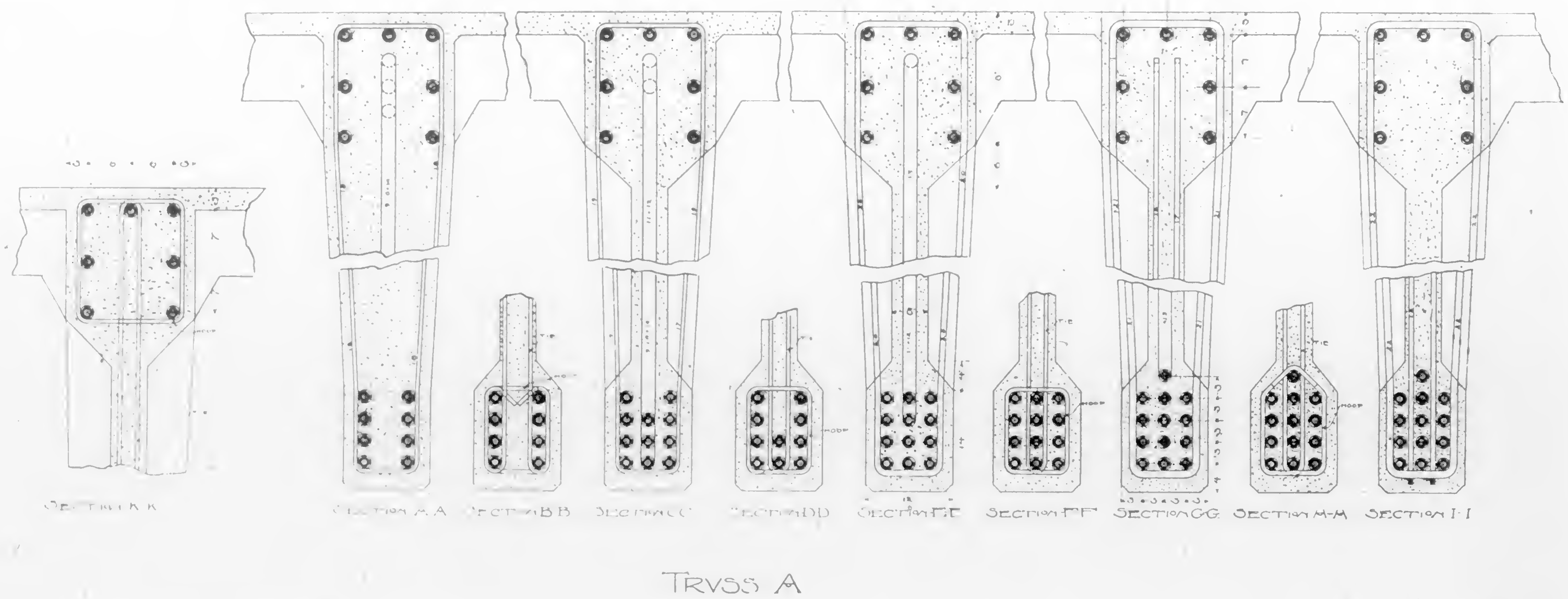
C-351



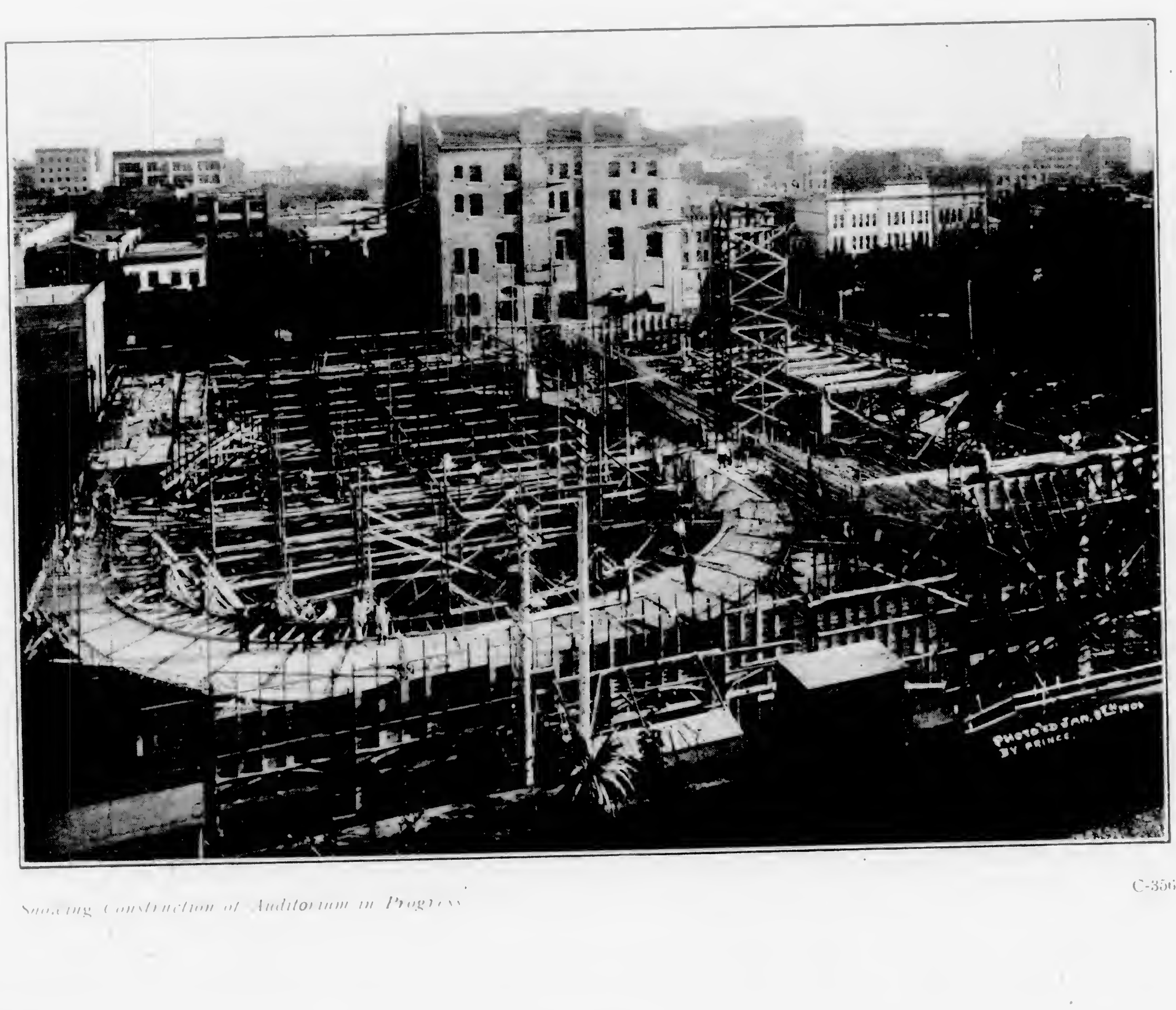
Sections through Main Trusses in Auditorium Roof



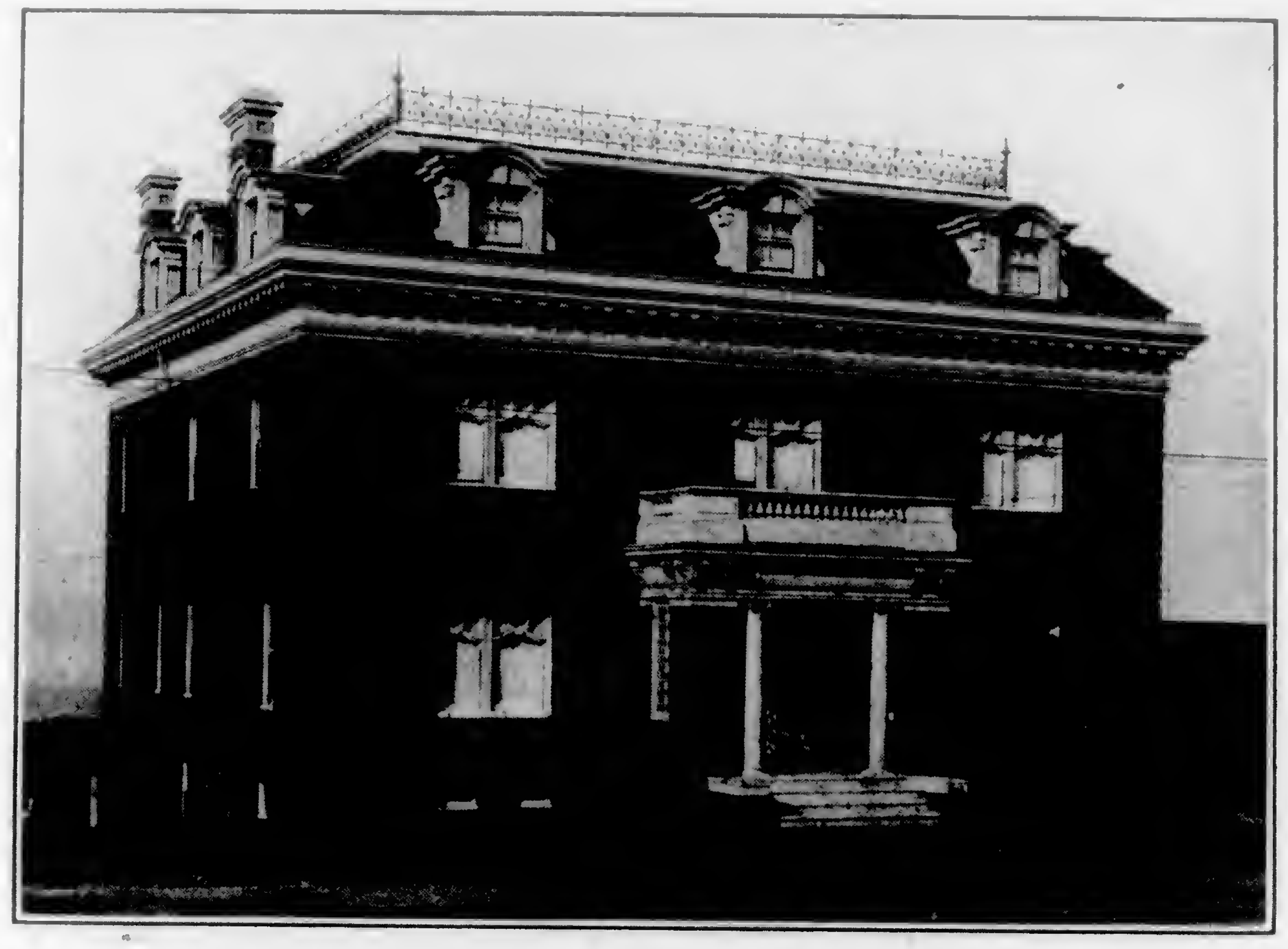
Showing Construction of Auditorium in Progress



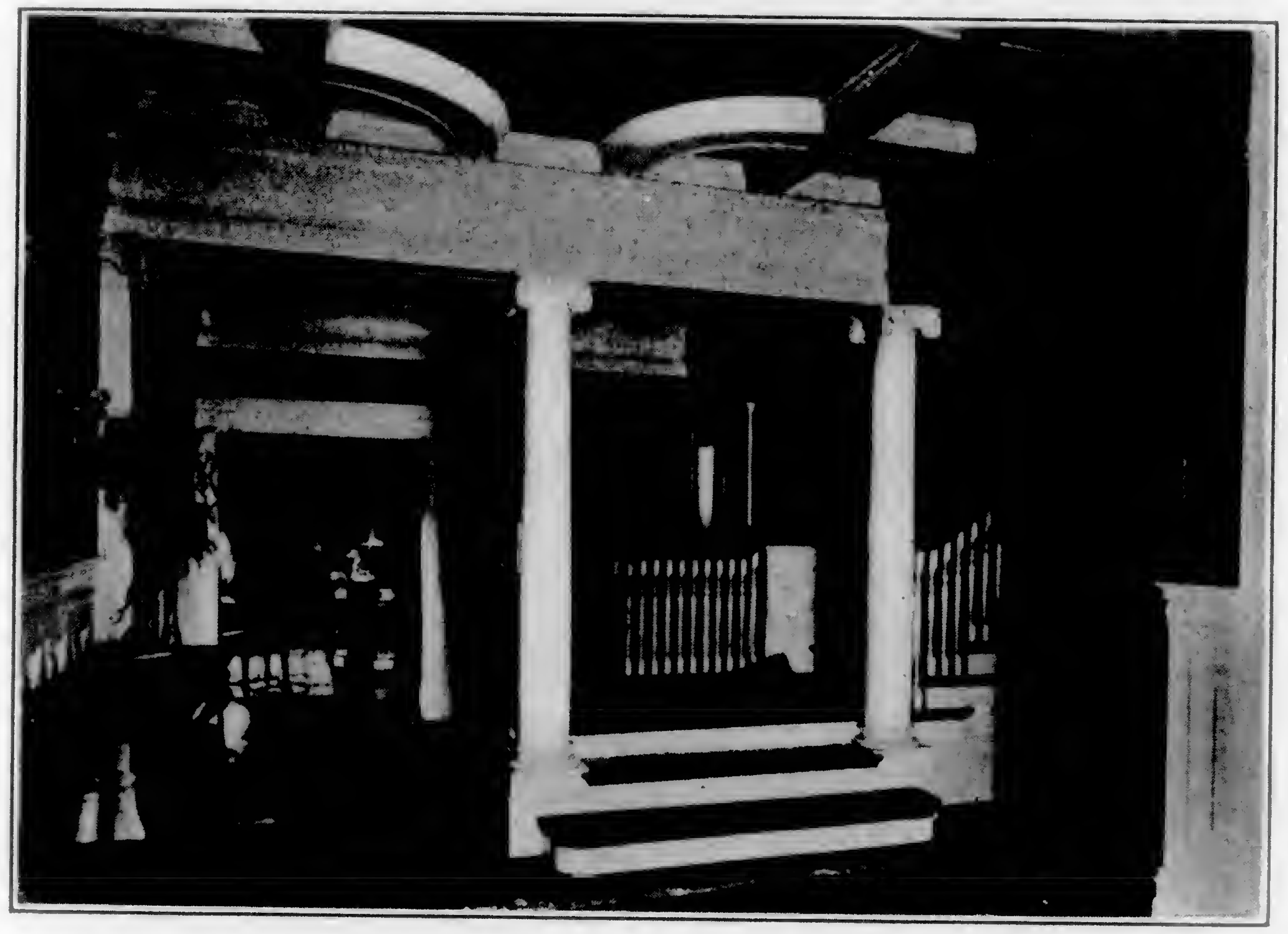
Sections through Main Trusses in Auditorium Roof



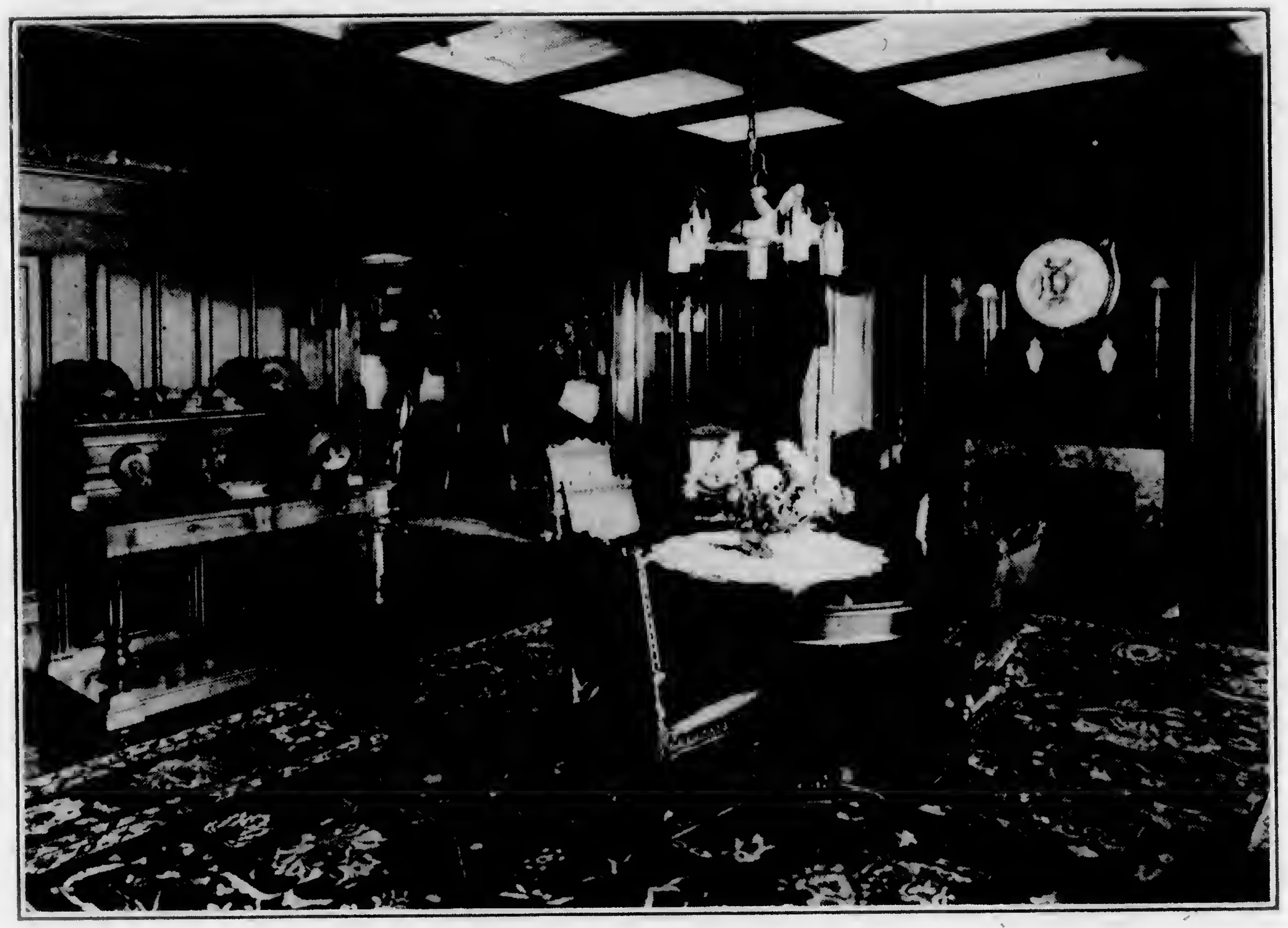
Showing Construction of Auditorium in Progress



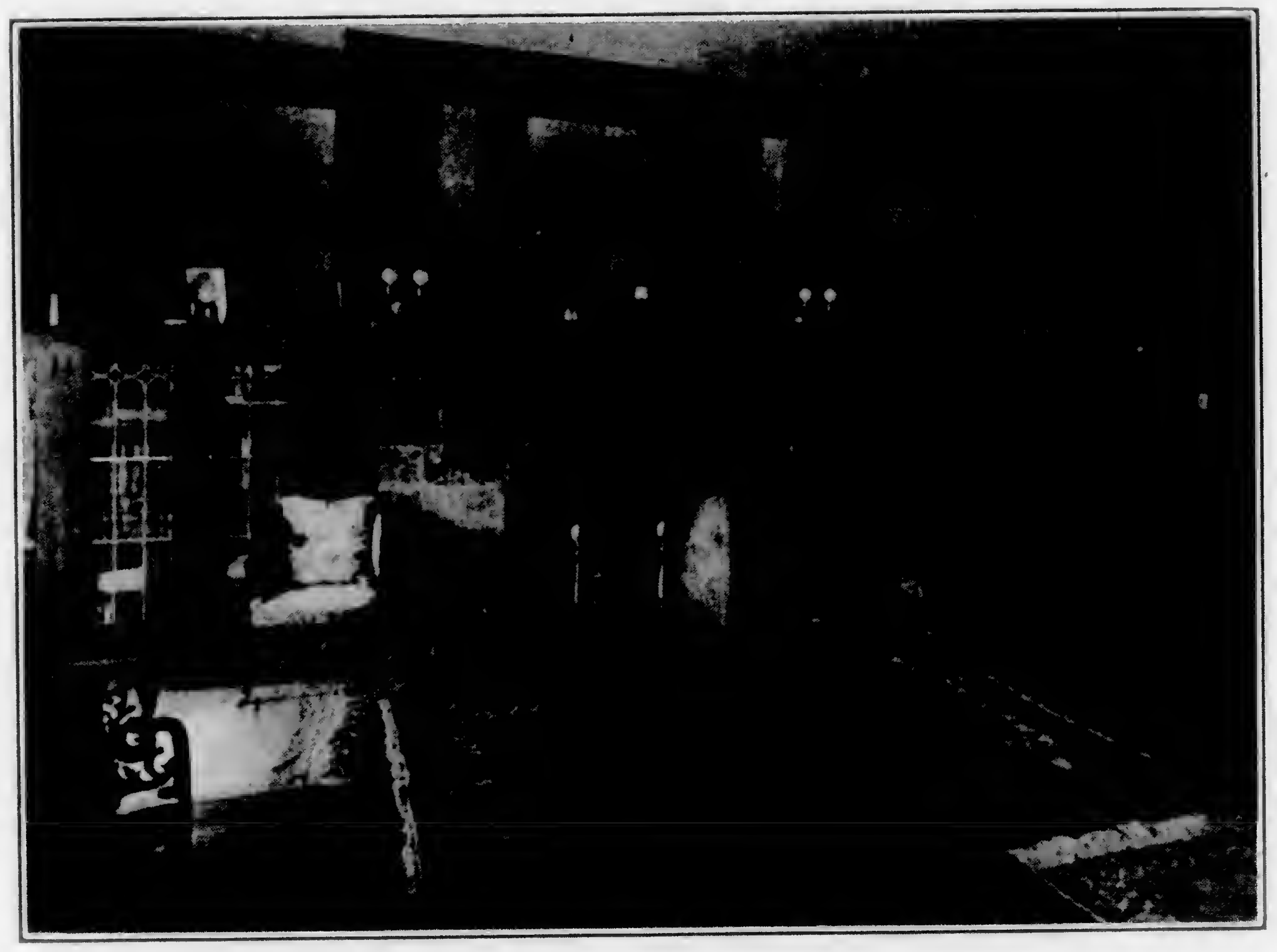
Residence of Mr. Leon Kauffman, San Francisco *Edgar A. Mathews, Architect* C-357



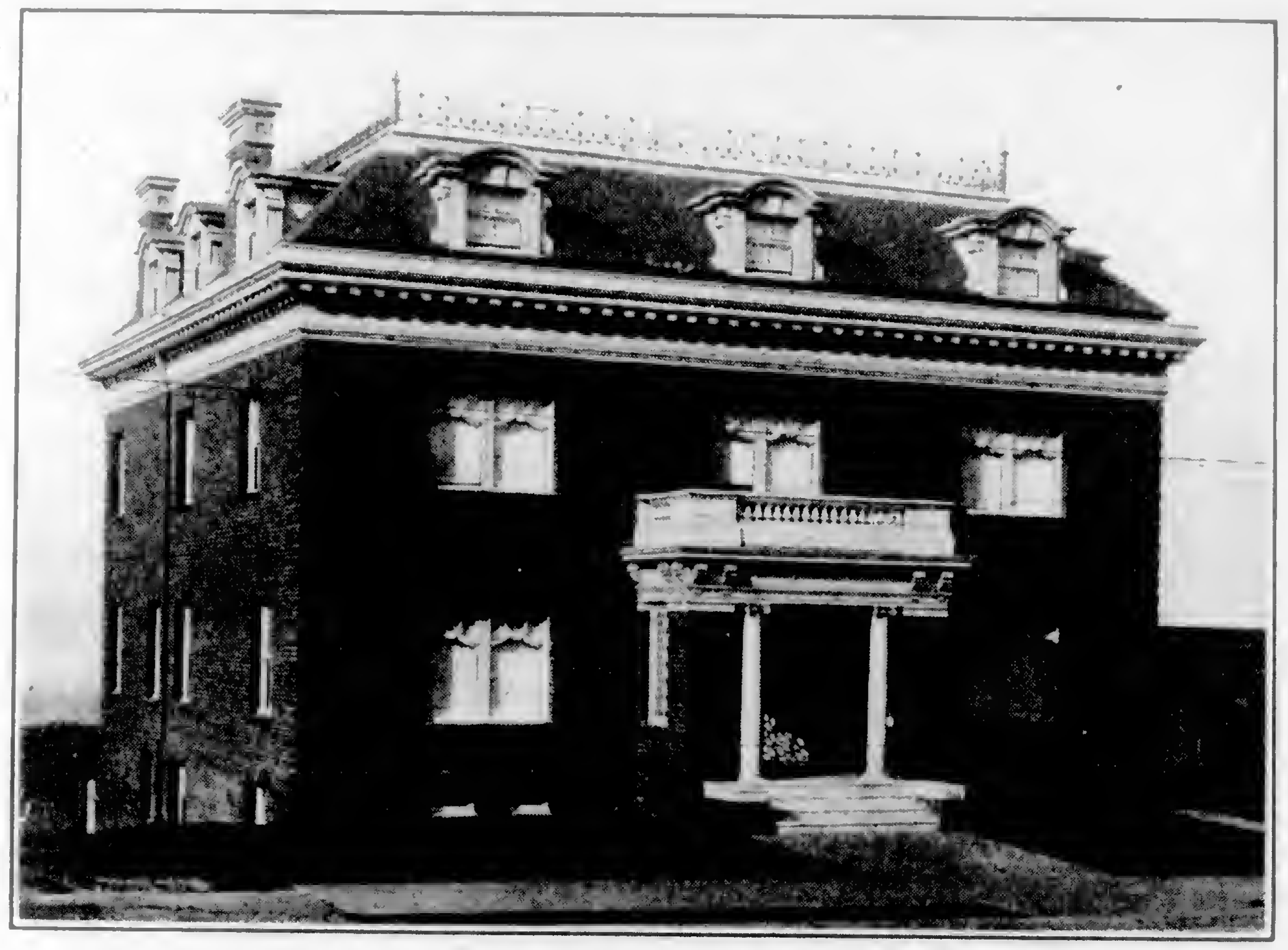
Hall in Residence of Mr. Leon Kauffman, San Francisco C-358



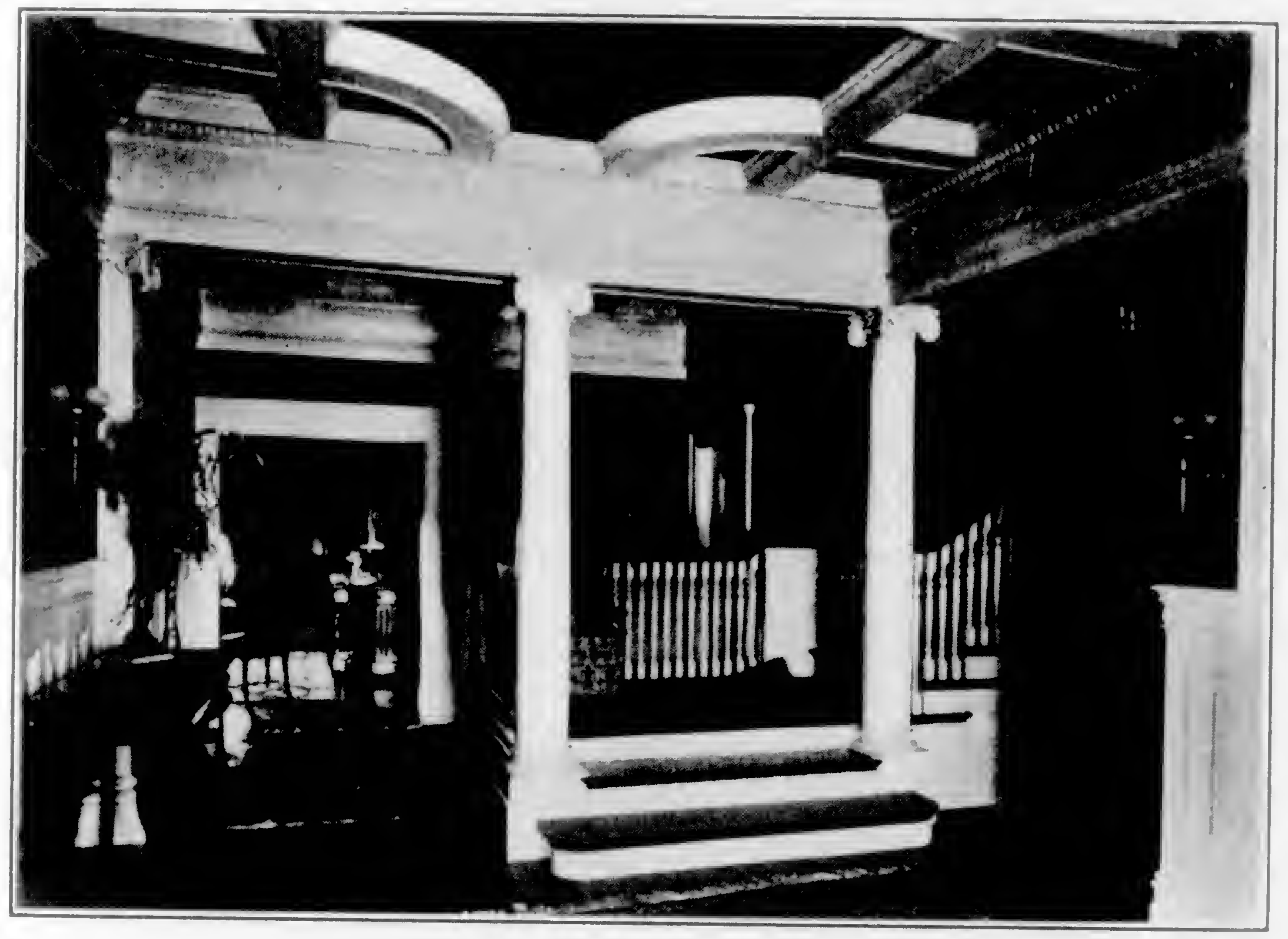
Dining Room in Residence of Mr. Leon Kauffman, San Francisco C-359



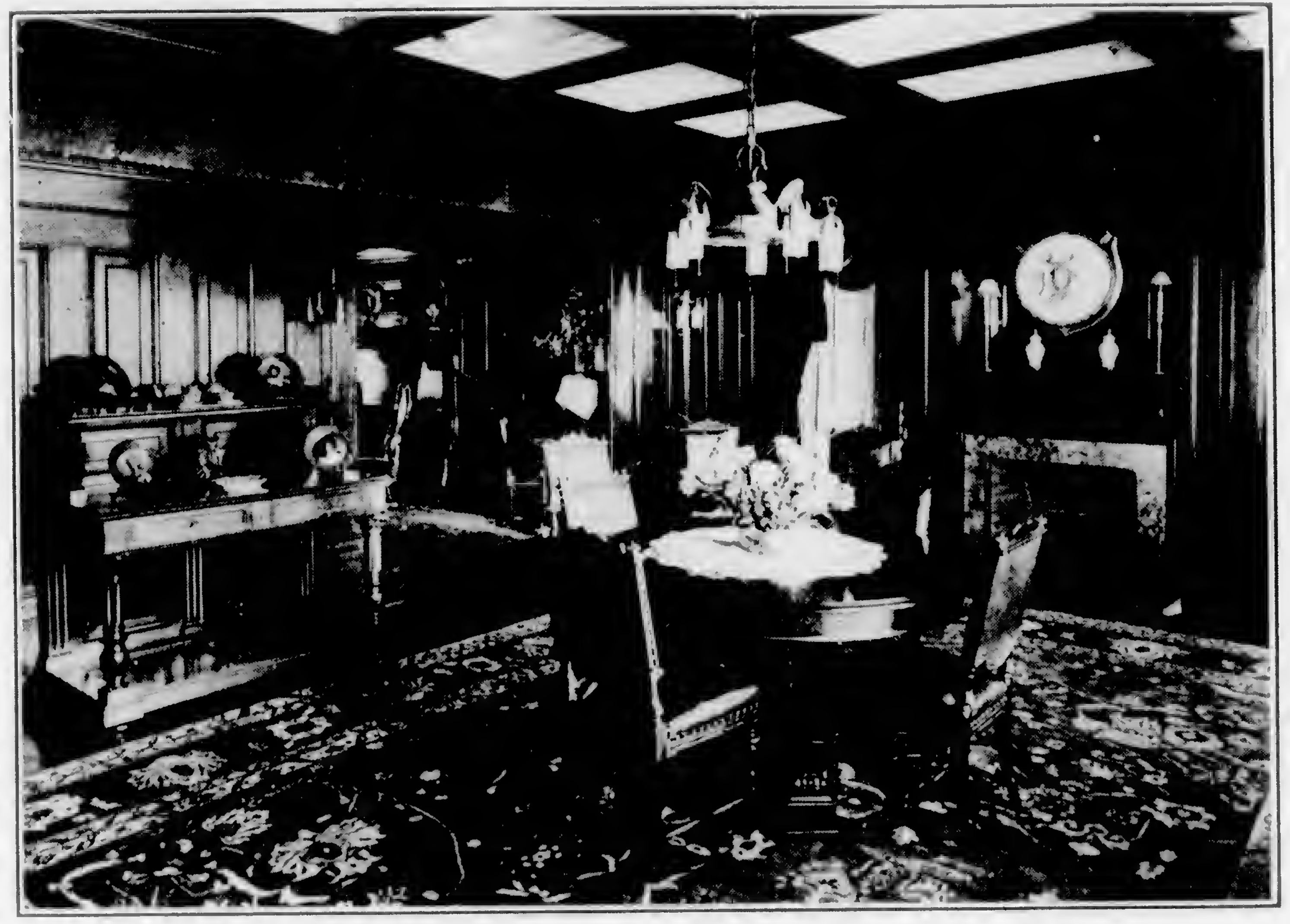
Library in Residence of Rudolph and Hugo Taussig, San Francisco C-360
Edgar A. Mathews, Architect *Panel Decorations by Mr. Arthur F. Mathews*



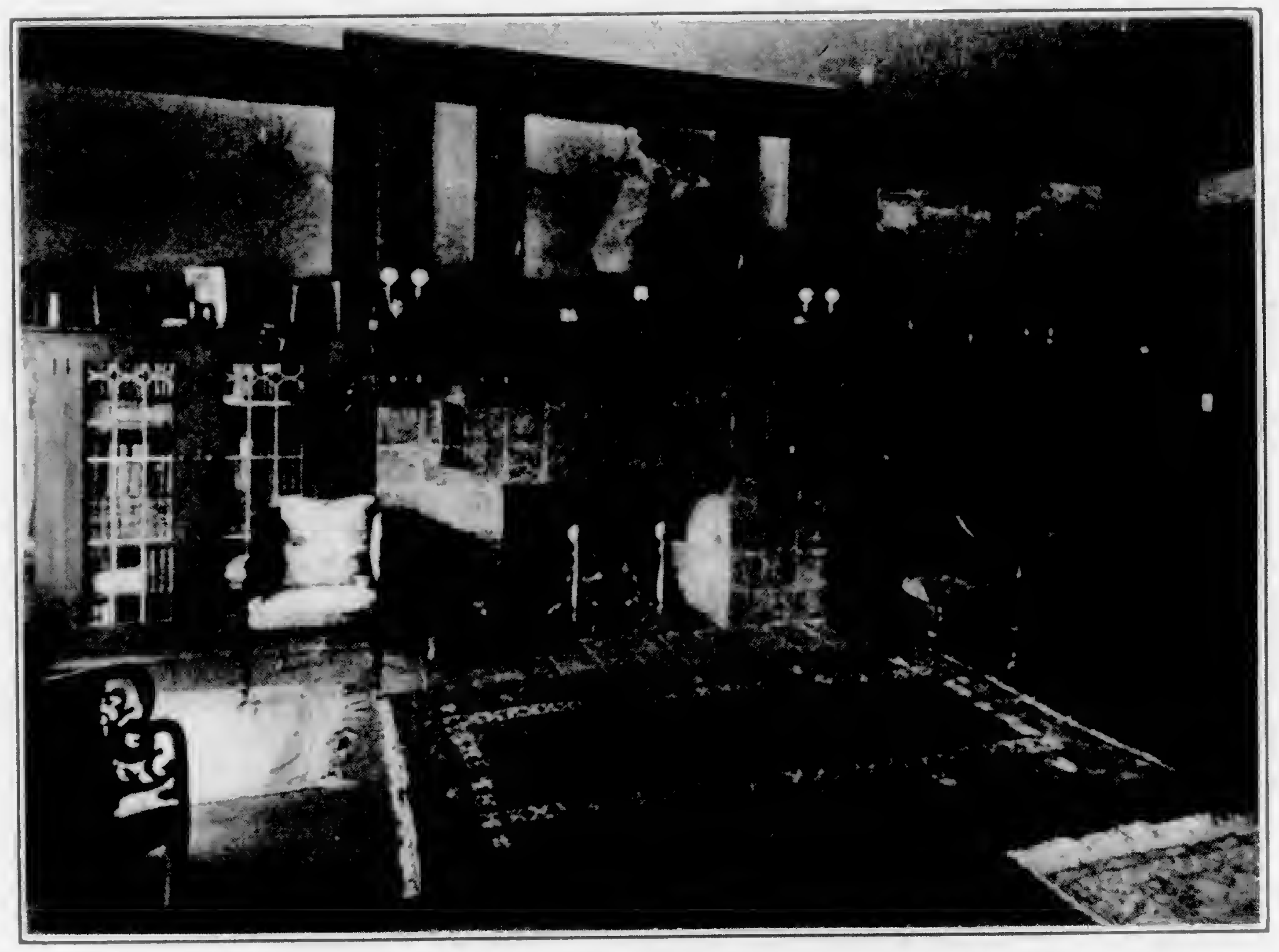
Residence of Mr. Leon Kauffman, San Francisco *Edgar A. Mathews, Architect* C-357



Hall in Residence of Mr. Leon Kauffman, San Francisco C-358



Dining Room in Residence of Mr. Leon Kauffman, San Francisco C-359



Library in Residence of Rudolph and Hugo Taussig, San Francisco C-360
Edgar A. Mathews, Architect *Panel Decorations by Mr. Arthur F. Mathews*

Steel Construction

By W. W. BREITE, C. E.

THE phenomenal increase in the erection of fire-proof buildings upon this coast, and the importance of structural steel in this form of construction requires that the processes of manufacture should be thoroughly understood and investigated so that design and specification be not accidentally or intentionally disregarded.

In dealing with this subject it is not the writer's intention to describe the multitude of ways by which designs are impaired by the slighting of details and unintelligent workmanship, but to call attention to many ways, where by the exercise of some common sense and a little precaution, the standard of manufacture in this vicinity can be greatly improved and made to compare favorably with the standards of workmanship of the large steel plants east of the Rocky Mountains.

That the development of the steel industry has been enormous within the last decade cannot be denied, but that this development has been retarded by the short-sighted policy of the manufacturers in failing to carry a sufficient variety in stock to meet the ordinary demands is a well recognized fact. As a rule the majority of the larger structures are fabricated in the East simply because of the inability to secure the proper material here. In cases where a structure of any size is to be fabricated locally (said cases being far too few) it is invariably necessary that the material must be redesigned so as to fit the odds and ends carried in stock here.

The policy of the shops here is to bid on a structure irrespective of the fact whether they have the material called for or not. If they secure the contract they then go to the architect or engineer with the statement that the material specified cannot be secured under a certain long period, thereby delaying the structure, and offer to substitute certain sizes and shapes which they have in stock. In order to carry on the work permission is almost invariably given to make such substitution, thereby securing in many cases a poor construction and incurring to the designer numerous worries and additional work. The remedy for this is simple. A time limit clause with a bonus or penalty rigidly enforced and a positive insistence upon using material as specified.

The quality of material entering into construction is another matter of grave importance. Mill tests are seldom if ever, demanded. The consequence is that much material that would not pass muster and be rejected in eastern shops, finds its way out upon this coast, to be eventually fabricated and palmed off as first-class material. The writer knows of a case of a carload of steel rejected by an eastern shop and sold out here, the quality never being questioned. Other cases of using old material, iron in place of steel, etc. Putty, lead and paint will cover a multitude of imperfections but cannot add to the strength of material.

The quality of workmanship also admits of great improvements. To a practiced eye, a glance at the various structures now in course of construction, is enough to convince whether the work has been fabricated locally or not. While it is admitted that the shops here are not as well equipped to fabricate first-class work as those centered in the great iron and steel districts, still it must be admitted that they can turn out better work than they do, but this will never be done unless they are compelled to. In a structure under the writer's personal supervision quite recently, the foreman, being taken to task for a piece of poor work, replied: "Hell! We always did it that way, and nobody ever kicked before." That it has "always been done that way" is no reason why it always should be.

The only safeguard to insure good workmanship is by proper and conscientious shop tests and inspection, the value of which is not fully appreciated until confronted by the improved quality of workmanship secured by the same. In one case called to the writer's attention, but ten per cent of shop rivets were perfect, forty per cent were very poor and the remaining fifty per cent were absolutely worthless, still as there was no inspector on this work, nothing was said or done and the material incorporated into the structure as it was. The owner paid for a first-class job and there was no reason why he should not have received it.

Few if any of the shops make templates of their work, the usual rule being to lay out material and connections with a tape or rule and chalk line. The result of this is easily seen not alone in the shop but in the erection by the reaming, cutting and drilling necessary to make members fit.

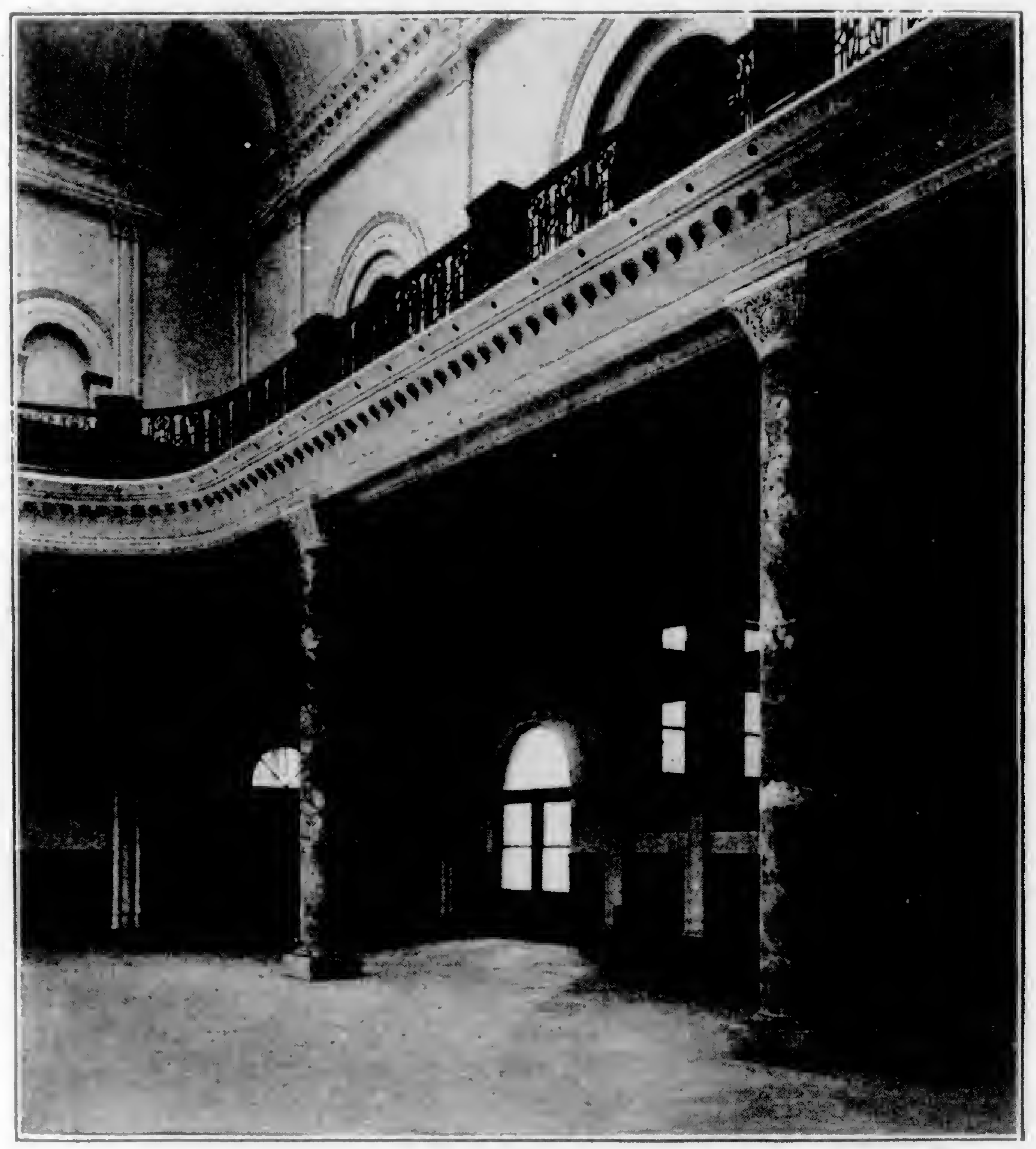
Another evil to be remedied is the making or at least the lack of making proper shop details. Proper details should be made for all structures and these details submitted to the engineer or architects to be checked and approved, so that the design be economically and properly developed. Material injured or lost in transit can easily be exactly duplicated if proper shop details are on file. Weights can be accurately estimated therefrom and form a check on shipments. Many cases have come under the writer's notice where the strength of details was less than the strength of design and vice versa. In one case the shop had adopted a connection for each size beam irrespective of the weight of beam or carrying capacity and all beams of that certain size whether of heavy or light section, two feet or forty feet long, or carried one ton or twenty ton received the same connection. Another case in the fabrication of plate girders a standard of six-inch spacing from center to center of rivets was used throughout, and the superintendent could not be made to realize that as the shear towards the ends of the girder increased, the distance from center to center of rivets should be less and advanced the same argument that, "He had done it before that way and it never fell down." It may be true that it "never fell down," but that is no criterion that it never will and if it ever should it is not the shop who would be blamed for improperly developed details, but the engineer for poor design.

While it is true that the quantity of cast iron used is far less than steel, it is also true that the methods and manufacture of such cast iron as is used be also investigated. Little attention is paid to the making of proper patterns and very few cases of good workmanship can be met with. Specimens of cast iron fabricated years ago in this locality, far exceed the workmanship displayed by work now being manufactured. The poor quality of the metal resulting from the use of too much scrap, improper facilities for pouring causing unequal cooling and many other points of manufacture admit of great improvement. The writer has examined columns supposed to contain metal two-inches thick in the shaft, but which in reality contained three inches on one side and less than one inch on the other. Blow holes were frequent and in some instance there was but one-quarter inch of metal. What has been said about shop details of steel is also applicable to cast iron, and in fact more so. All brackets and connections should be accurately figured to sustain the loads imposed thereon and not left to be guessed at by some irresponsible shop superintendent as is often the case.

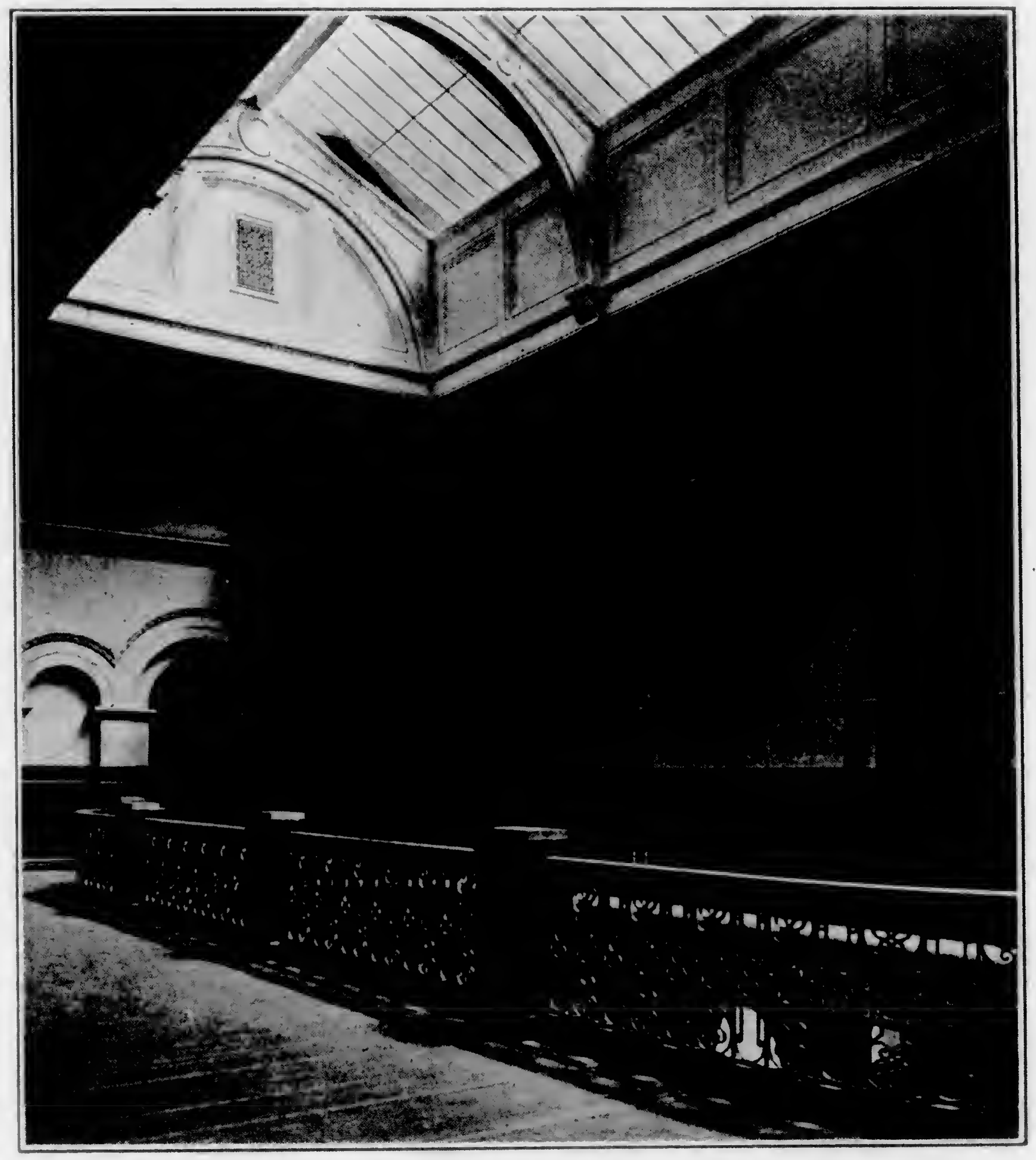
Another subject of traditional interest is painting. Many private preparations are on the market and almost any of the leading brands are good. Oil is also used to a great extent but the practice of using four parts oil to one part paint when nothing but pure paint is specified is a practice to be condemned.

Paint should be applied to a clean, dry surface, free from rust or scale and well brushed out. Good paint improperly applied is worse than poor paint skilfully used or no paint at all.

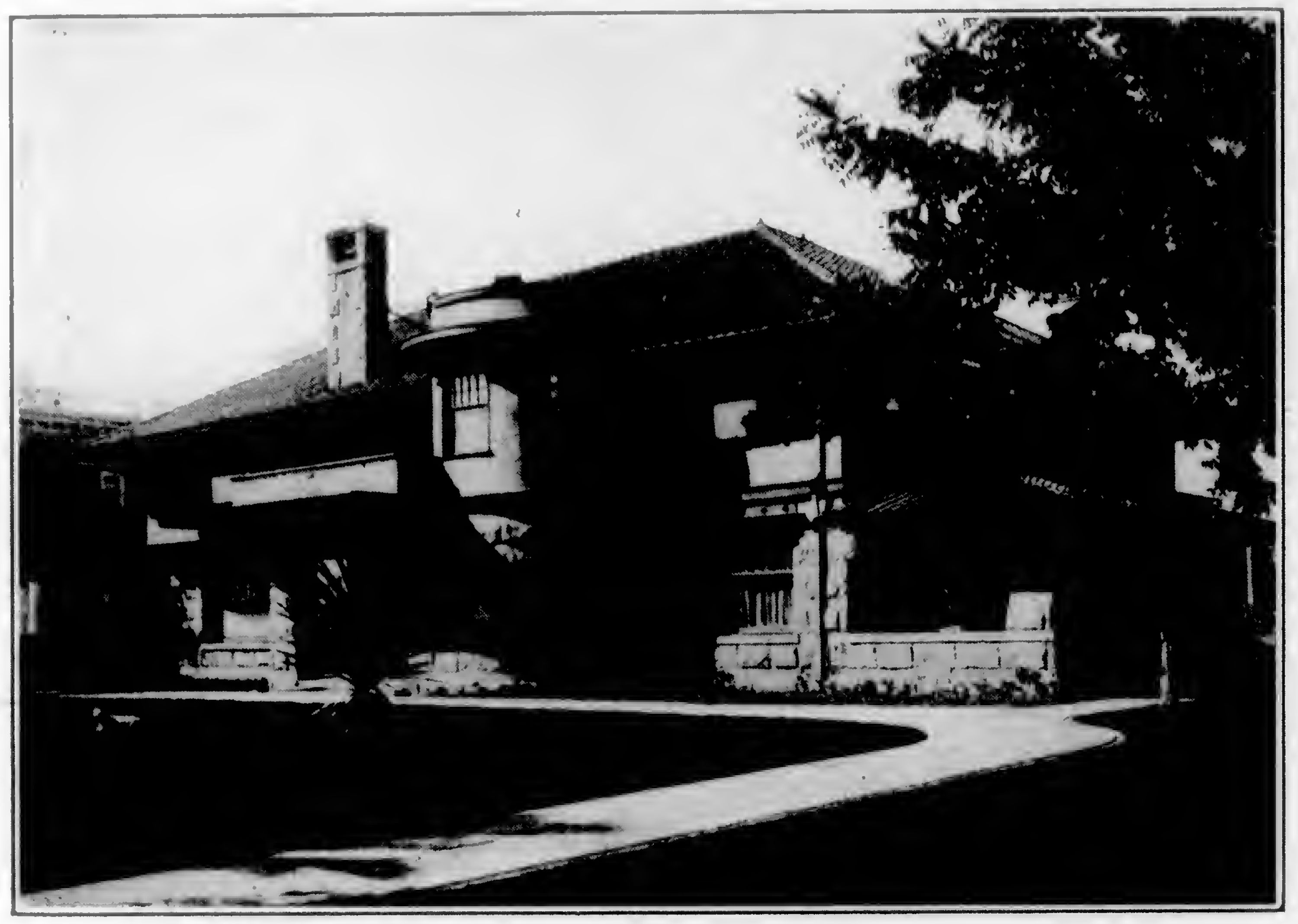
Many of the manufacturers here contend that they cannot compete with Eastern prices. The sooner the local shops realize that the question of quality of material and workmanship is often a more important factor than the question of price, the local industry will be better patronized and the work will be fabricated here where it unquestionably should be.



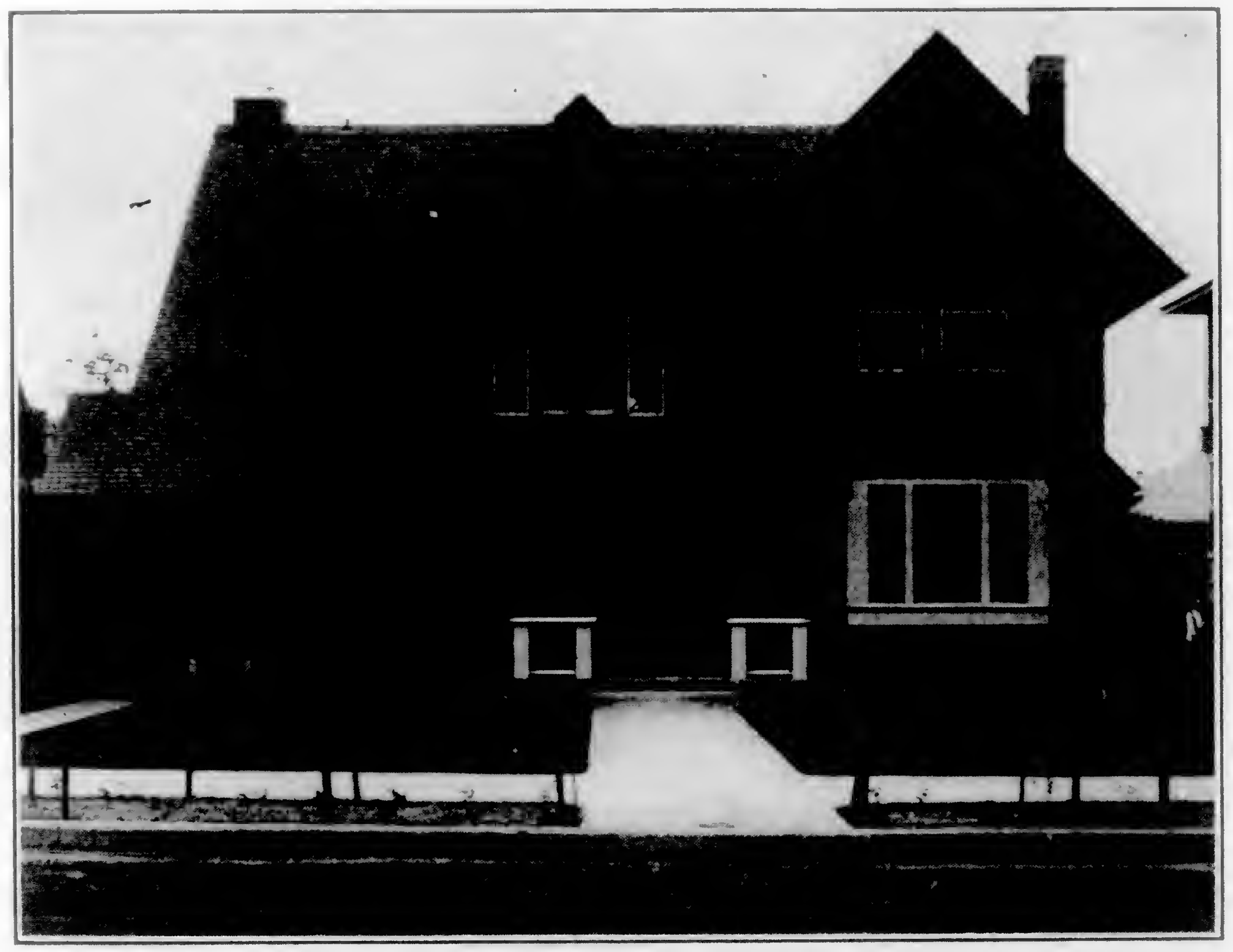
Main Floor of Exhibition Room, Natural Sciences Building, Stanford University
Henry A. Schulze, Architect C-361



Gallery Floor of Exhibition Room, Natural Sciences Building, Stanford University C-362



Residence of Mr. Lee Foster, Los Angeles *Hunt & Eager, Architects* C-363



Residence of Mr. J. B. Lippincott, Los Angeles *Hunt & Eager, Architects* C-364

Fire Proofing and Insurance*

By EDWARD T. CAIRNS

THE appointment of this Committee only three months ago was so recent that there has been no time for organized research or experiment on an extended scale, but the views of the individual members of the Committee based on their personal experience and investigation, are combined in the following report which is presented as an outline of the most important work done on the subject up to this date, and acknowledgment is made at the same time that the subject is very imperfectly covered and that the members of the Committee have much to learn regarding the fireproof qualities of cement. Indeed, there is such a scarcity of reliable data, and so little actual experience with fires in buildings of any form of concrete construction, that, at the present time, any discussion of the subject must of necessity be largely on a theoretical basis, or, at the best, on the basis of laboratory experiment, both of which, while valuable and necessary, must be supported by actual field experience before the subject can be regarded as properly covered.

In considering the so-called fireproof qualities of cement or concrete it will be well to fix in our minds at the outset the proper definition of the word "Fireproof." In a technical sense there is of course no such thing as a strictly fireproof building, that is, a building which is absolutely proof against damage by fire; there are, however, many materials which are non-inflammable and capable of resisting or retarding a fire of ordinary intensity for a sufficient length of time to allow the extinguishment of the fire with nominal damage to the structure. Therefore a building properly constructed of such materials may be entitled to the nominal term fireproof though, as a matter of fact, the strictly correct term would be fire resistive. Whether it is practical at this late day to make any such grammatical distinction of terms is doubtful, so that perhaps it will be as well for us to recognize the old term "Fireproof," notwithstanding its faults and the fact that in the past it has been the occasion of some misunderstanding and the cause of an over confidence which has cost many a building owner dearly.

By cement in fireproof construction of course we mean generally, the Portland cement which forms the vital element in monolithic concrete either plain or reinforced, or concrete block construction, and since cement is always used in connection with the other materials making up concrete of some sort, we may as well use the term Concrete Construction in place of Cement Construction.

That good concrete is a fireproof material in the above defined sense is a well established fact, as has been demonstrated in a limited way by tests in laboratory and field. Most of the laboratory trials have been made with small buildings ten to fifteen feet square, heated to 1700 or 1800 degrees with wood or gas fires for two to three hours' time—a test which, while not calculated to demonstrate the ultimate fire resistance, is thought to approximate the ordinarily severe fire which may be expected in most kinds of buildings; good concrete has successfully passed these tests and the occasional failure of poor material under the same trial has taught some valuable lessons.

The field experience is more difficult to summarize. The first case in mind is generally the great Baltimore fire in which were several small buildings involving more or less concrete construction, all of which came through the fire very well, though the conditions were somewhat favorable in that the fire in each individual building was of short duration and no water was played on the building while hot. The Iroquois Theatre fire in Chicago was another case of a concrete building suffering very little damage, but in this case also the fire was of very short duration and the test therefore very mild. The Pacific Coast Borax Co. in Bayonne, N. J., suffered a severe fire about four years ago in a building all of concrete except the wooden roof. In this case the test was very severe in the upper part of the structure, and the damage to the concrete very trifling, a good test with remarkably good results. Other fires of less prominence have occurred with similar results.

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*Report of Special Committee read at Cement Workers Convention Milwaukee.

Considering first reinforced concrete: In order to be fireproof in the accepted sense the concrete itself must possess two important qualities, viz.: 1st. it must be capable of withstanding such disintegration or breaking as would either diminish its own strength or expose to fire the steel reinforcement; and, 2d, it must effectually insulate the imbedded steel reinforcement from the heat of a fire even when not broken down.

There are several factors affecting the first of these requirements; the stone or other aggregate must not lose its strength, or break or fly in pieces readily. In this particular there is doubtless some difference between the various aggregates commonly used, though we have only a limited amount of data bearing on this point. The National Fire Protection Association's Committee on Cement for Building Construction conducted a series of experiments a few months ago which afforded a comparison between Limestone, Gravel which contained a considerable proportion of lime, Granite and Cinders. These tests showed practically no breaking or spalling of the concrete, but the conditions were favorable to such result in that the samples were rather small and were so arranged in the test furnace that throughout the tests they were free to expand in all directions and the individual stones of the aggregates were of small size, not larger than ¾". Analysis of numerous tests by the New York Building Dept., the British Fire Prevention Bureau, and other sources, also fails to reveal any decisive difference in fire resistance of various concretes due to difference in the kind of aggregates in common use. The latest test of this which has come to our notice was made last October by the British Fire Prevention Bureau, which included simultaneous trial of seven small slabs of 1-2-3, concrete of different aggregates described as Slag, Broken Brick, Coke Breeze, Furnace Clinker, Granite, Burnt Ballast and Thames Ballast, the relative efficiency from high to low being about in the order named. Two of these, Furnace Clinker and Thames Ballast, were quite deficient, but the others did not differ widely and the result was similar to that obtained in many other tests, that is, some small cracks developed and in some cases the material was washed off by hose streams to a depth of an inch or so, but none of the slabs broke down. It is the opinion of many that Granite or any stone containing a relatively large percentage of water crystals is most objectionable as it has a tendency to burst as the crystals are decomposed, this danger being obviously greatest where the individual stones are of a large size and the use of such stone in concrete is therefore objectionable.

Limestone has been criticized as an aggregate on the ground that it is calcined or reduced to powder quickly under high temperature. It is true that it does lose its strength in this way more easily than most other stones, but this Committee are of the opinion that the stone does not so weaken much, if any, before the cement which binds the units together, so its weakness is not really such an important matter as might at first appear. It is probable that trap rock, a hard dense stone found in some Eastern States, or silicious gravel, or strictly clean clinker, make the most desirable aggregate from the fireproof view point, though the latter being practically unobtainable in sufficient quantities, makes a recommendation for its general use unwise.

The kind of sand, or its state of purity or sharpness, is thought to affect the fireproof qualities of concrete only as it affects the normal strength of the material and therefore the factor of safety upon which the endurance of the structure under fire largely depends.

It is very evident of course that the integrity of concrete under exposure to fire, as well as under normal conditions, depends primarily on the cement which binds the mass together and in this fact lies the most important inherent weakness of concrete as a fireproof material. As to the fireproof qualities of Portland Cement itself, very little data appears to be available. The Standard Specifications adopted by the Am. So. for testing materials, the Am. So. of Civil Eng. and others, does not touch on the point at all, possibly for the reason that some have assumed that cement which meets the other requirements as to strength, soundness, etc., cannot vary much in fire resistance, and perhaps for the reason that a very large part of the cement for which these specifications are prepared, is used in bridges, embankments, marine work, etc., where fire resistance is not a factor. Neither do the U. S. Army Engineers, nor various foreign specifications cover the point, probably for the same reasons. Cements which conform to the standards above referred to cannot vary much in the proportion of their chief constituents, though some of the minor elements do vary considerably, and it is well known that there is quite a wide difference between various brands as to the quantity of water required for hydration and it may be these differences, especially the latter, may have an important bearing on the fire resistance. Various experiments now under way will doubtless settle the question within the next year or two, but for the present we must assume that all Portland Cements conforming to the accepted standards in other respects are of equal fire resistance.

The statement so often made that cement is necessarily fireproof because in the course of its manufacture it has been burned in a kiln hotter than any burning building is not true any more than is the same statement concerning hollow tile or other materials. They both appear in a building under radically different conditions than obtain in any sort of a kiln, the important difference in the case of the cement being that when mixed into a concrete it is combined in a crystalline form with water which is a material very easily affected by heat. There is no occasion for discussing here the intricate question of the chemistry of cement. It is sufficient to say that the effect of heat is to dehydrate it or separate the water from the cement and thus reduce it to a condition resembling its original powdered state. The temperature at which this dehydration occurs is probably about 1000° F.—that is, the cement itself must reach that temperature, but concrete being a slow conductor of heat, any considerable mass of the material cannot absorb that amount of heat for some time after the temperature at its surface has reached the 1000° or even a very much higher point; hence it is that in a burning building a temperature of 1000 to 2000 degrees may be applied suddenly to the surface of a concrete wall or floor and the result will be an immediate dehydration of only a very thin film of cement at the surface and a very slow progression of dehydration into the interior of the mass. As above stated, this dehydrated or re-calcined material does not necessary fall away unless struck by a stream of water or other object, or unless the rupture of individual stones in the concrete throws it off, and so long as it remains in place it acts as a very efficient insulator for the remaining good concrete beneath, so that the penetration of heat into the mass and its consequent dehydration grows slower and slower. If by this process the cement loses its adhesive strength, of course the concrete is ruined, and in the case of walls or columns, its crushing strength is reduced in the proportion that the dehydration of the cement has penetrated from the surface, and this is irrespective of the kind of aggregate used. The logical conclusion of the above is that, given a cement and aggregate of good quality, the fire resistance of a concrete wall or floor is entirely a question of the time of exposure and temperature of the fire.

Whatever the comparative value of various aggregates or cements may be, a far more important factor in the strength of concrete under fire as well as under normal conditions, is the relative proportion of the materials and the method of combining them. The necessity of a dense, fairly rich concrete practically free of voids such as is produced by a wet mixture well tamped, is well known to all experienced users of the material, and the troubles occasioned by mixtures containing too little cement, or made too dry, or not properly tamped, are perhaps too familiar to some of us. This feature has a direct bearing on the fire resistance of the structure, as a dense, rich mixture is much less liable to spalling and disintegration than a poor, porous concrete; and if the theory is correct that the dehydration of the cement itself or the driving off of its water is what weakens the mass, then the richer in cement the mixture is, and consequently the more water is contained in the mass, the longer the cement will last because a longer time will be required to drive off the large amount of water. Furthermore, its factor of safety above the strength required for normal conditions is naturally much greater and that has a most important bearing on the fire resistance feature; a structure so built that a considerable proportion of its ultimate strength may be destroyed by fire without causing a collapse, obviously has a much greater chance of escaping total loss than one which, though non-inflamable, has no great strength above that required for normal conditions, and so would be subject to collapse on the failure of some one or two of its vital members. The abnormal strains to which a building is subject during a fire are always severe and often not to be determined in advance; the falling of heavy weights and internal stresses set up by rapid changes of temperature are severe trials to any building and the structure that contains the greatest reserve strength above that required for ordinary demands is the safest. This of course refers to any type of construction as well as to concrete, and the disregard of this principle has in many cases cost dearly in case of fire. In the famous Baltimore conflagration the great weakness of tile and steel construction was along this very line; the tile was good enough for its normal uses but was generally too thin and frail and too poorly secured in place to withstand the mechanical strains imposed by a severe fire.

As to the second general requirement of insulating quality of concrete for the steel reinforcement, the importance of this function of the material is apparent when we remember that in practically all reinforced concrete construction the steel, of whatever style or system, is designed for the vital duty of carrying all the tensile strains of the structure and in order to do this it must be placed as low as possible in the beam or slab; in fact, there is no reason, structurally, for more than barely covering the rods. It is well known that steel loses its strength very rapidly on exposure to fire, and steel of any form used as a reinforcement for concrete, is no exception to the rule. According to "Kent" the tensile strength of steel at 670 degrees is only 75% of its ultimate strength under normal temperature; at 725 degrees, 60% at 770 degrees, 50%; at 860 degrees, 40%; at 1025 degrees, 30%; from which it is obvious that the reinforcement of a concrete floor beam, slab, column or wall must have some very efficient insulating material between it and an ordinary fire if its strength is to be retained. It is well known that concrete is a very slow conductor of heat but there is only a little exact data on the subject. The tests of the National Fire Protection Association Committee above referred to were chiefly for the purpose of determining that point and showed that on an average of eleven sample rods embedded to a depth of one inch in concrete reached a temperature of 670 degrees where their strength is reduced 25 % in 59 minutes under average temperature of about 1500 degrees at the surface of the samples.

This would appear to afford ample proof that one inch of concrete covering over steel reinforcement, or about steel I-beams, is not sufficient for reliable fire protection. In many large buildings, particularly of mercantile or storage occupancy, temperatures of 1800 to 2000 degrees may prevail in portions of the structure for much more than an hour, in which case 2 inches or more of protection would be necessary to preserve sufficient strength in the steel to carry its load. This would be true even if all the concrete were certain to remain in place during a fire and with the possibility of some of the material breaking off the extra thickness is doubly necessary. As to the relative value of the various kinds of aggregate as an insulator, none of the numerous tests referred to indicate a very wide difference, but such variation as does appear is in favor of the cinder aggregate and most unfavorable to the granite. Here again the superiority of a rich, dense concrete appears, as the tests indicate that as between rich, medium and lean mixtures the richer mixtures were appreciably slower conductors of heat than the lean ones.

The fire resistance of concrete blocks for wall construction has been the subject of much anxious inquiry for some months past. The question is being investigated by several interests but probably most exhaustively at the Structural Materials Testing Laboratory of St. Louis by your President, Mr. Richard L. Humphrey, under the auspices of a general Advisory Board composed of representatives of a large number of engineering bodies, including this Association, and government officials. The result of this and other investigations of course cannot be foretold by this Committee, and the actual field experience with this construction thus far is too limited to afford a basis for positive conclusions. However, we are confident that most of the foregoing statements on the subject of concrete in general are applicable to small blocks of the same materials. The form in which most of these small blocks are made, involves a certain weakness under severe temperature which, while by no means fatal to the fire resistance, places a limitation on that quality which must be recognized, viz: It is subject to breakage by unequal expansion under heat, the same as is hollow tile or any other similar hollow material. Hollow blocks of concrete or tile as set in the walls or floors of a building usually present only one surface to the direct attack of fire and the consequence is that that side or face of the block expands readily and irresistibly under the influence of the heat while the other three sides receiving much less heat do not expand nearly as rapidly, with the result that the hottest side breaks away from the others. This has been demonstrated in actual fires and experimental tests for both concrete and tile. Failure from this cause would naturally occur soonest in blocks having a thin shell, inasmuch as the thinner the shell of the block toward the fire, the more quickly it will heat through and consequently expand. Therefore, if you would have a block stand a hot fire, make the webs thick.

This breaking by unequal expansion has sometimes been referred to as a bursting due to pressure of steam or gases generated in the large hollow space or cell of the block, but a very brief analysis of the conditions will easily disprove any such statement. In the first place, there is generally no means of getting water into the interior of a block and no probability of gases from other sources being introduced therein, but if it were possible to get gas or steam into the interior space these cells are so continuous in a wall or floor and have so many vents to the atmosphere at the top of the wall or through mortar joints that the accumulation of the number of pounds pressure (estimated at 25 to 50 lbs.) necessary to burst an ordinary small block would be an impossibility under working conditions. In connection with blocks, we may repeat that as in the case of monolithic concrete, good materials, plenty of cement, careful curing, and above all intelligent workmanship, produce the most fireproof result.

To sum up this matter of the fire resistance of concrete, we may repeat that, while like all other building materials it has its limitations, it occupies and will continue to occupy an increasingly important position in the field of Fire Resistive Construction, and when intelligently used under proper conditions, may be relied on to resist such fires as any ordinary building may be expected to experience. Such intelligent use will involve the selection of good materials, will provide for the correct and uniform proportioning of them, the thorough mixing by good machinery, adequate thickness of insulation of steel, guarding against freezing, and in the case of blocks, proper curing and thickness of shell; in short, all the requisites of a building safe and strong under normal conditions with a liberal factor of safety. It may be safely assumed that concrete which is the richest, strongest and most durable under normal conditions will develop the highest fire resistance.

The relation of fire insurance to concrete construction is important to insurance companies and builders alike. The attitude of the companies toward concrete up to this time has been, like that of other interests, necessarily, one of inquiry and investigation largely. They have felt that this type of construction was in an experimental stage, acknowledged as peculiarly subject to abuse by incompetent users, and have naturally been somewhat cautious in indorsing it as fully as its advocates would like. They are now recognizing, however, that the matter is rapidly approaching a settled and known basis in the building world and they are at the present time according it more recognition in their underwriting than ever before. Insurance companies are the most earnest advocates of improved construction and are constantly urging the adoption of the best known methods and materials for building. They are investigating the whole concrete subject through the National Fire Protection Association and other channels and there need be no doubt that concrete construction will be given full credit in fire insurance rates and classifications for all its good qualities as soon as its record is established. In the meantime they are giving very liberal credit to so-called fireproof buildings of concrete construction, pratically the same as are allowed for other types as a rule. They are not, however, recognizing concrete blocks as the equivalent of good brick for the reason that such experience as they have had in laboratory and field does not warrant it. This is no doubt due partly, if not chiefly, to the fact familiar to us all, that a large proportion of the blocks made up to this time, have been of an inferior grade made without due regard to the known requirements of a good product; and in the matter of insurance rates as in other respects, good material has been made to suffer for the failings of the too large proportion of poor.

In closing, we cannot too strongly emphasize the fact that the position concrete is to occupy in the art of fireproof construction will depend very largely on the degree of intelligence and honesty of its users. It has had something of a fight to attain its present position. It is not a new proposition. For years it has been known and for as many years has been criticised as being peculiarly subject to abuse by incompetent contractors, a criticism which we must admit is altogether too well founded, and for which some of its most ardent advocates are partly responsible. There will always be more or less such criticism, but it can be largely overcome and the art maintained on a sound basis by the intelligent and persistent following of sound engineering principles and good workmanship on the part of its advocates.

The time has not yet arrived for adopting a detailed standard for fireproof concrete construction, but we would commend to you a few fundamental principles which were laid down by the National Fire Protection Association in their last report as essential to the best results, viz:

1st. The work should invariably be designed and its entire erection supervised personally by engineers of skill and experience in this particular line.

2d. Concrete for fireproof construction should be composed of high grade tested Portland Cement, clean sand, and broken stone, gravel, slag or cinders, so proportioned that the cement will completely fill all the voids in the sand, and the mortar thus formed will a little more than fill the void in the aggregate.

3d. The materials should be well mixed by machine with enough water to make a distinctly "wet mixture" and should be tamped down so that no voids are left.

4th. All steel members of whatever style should be imbedded at least two inches in the concrete and in the case of important load carrying members, three inches.

5th. No cement work of any kind should be laid in cold weather without being safely guarded against freezing.

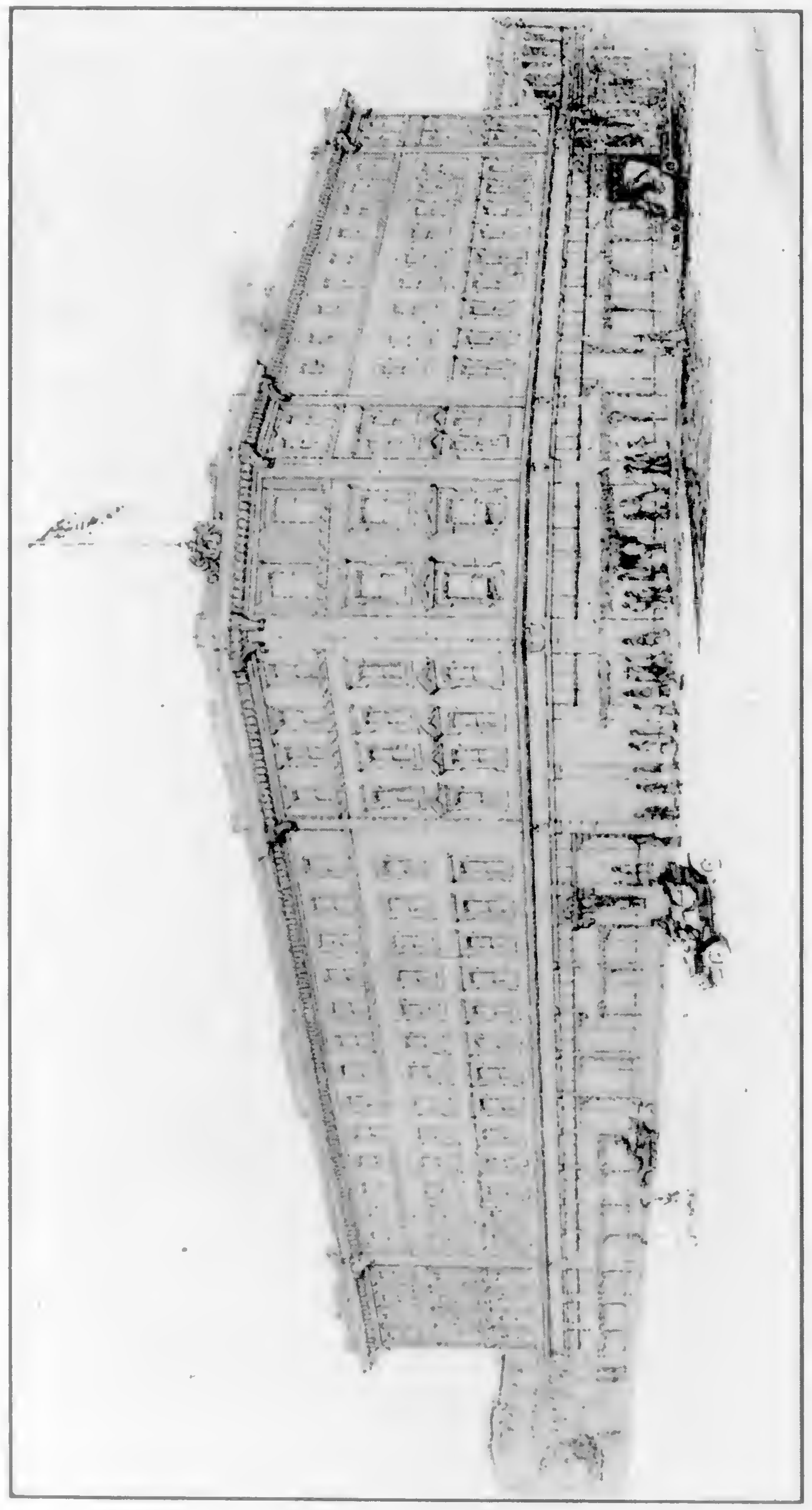
Arts and Crafts of Los Angeles

This society is giving its first annual exhibition in co-operation with the Ebell Club in the very attractive building recently erected by the Ebell Club on S. Figueroa street, Los Angeles. The exhibition will be open on the 28th, 29th, 30th, and 31st of March. Collections of work belonging to the Colonial-Spanish and Indian periods will occupy three of the large club rooms on the second floor, while the whole of the first floor reception hall and rooms will be devoted to Oriental work. The auditorium will be reserved for the "Arts and Crafts," who will assemble a fine exhibition of the handicrafts, not only from its members of the society, but also from San Francisco, Santa Barbara, and San Diego. There will be examples of work from New York and some loans. Communication is invited and may be addressed to the secretary, W. Carl Greenfield, 1608 S. Main street, or to the president, R. Mackay Fripp, Mercantile place, Los Angeles.

* * *

Servant (delivering message)—Mr. Triplett sends his compliments to Mr. Gazzam, with the request that he shoot his dog, which is a nuisance in the neighborhood.

Gazzam—Give Mr. Gazzam's compliments to Mr. Triplett, and ask him to kindly poison his daughter or burn up her piano.



Panhandle Building, San Francisco   *Henry H. Meyers and Clarence R. Ward, Architects*   C-365

Building and Designing the "Skyscraper"*

By EDWARD S. MAMMATT, Architect.

THE materials of construction of high office buildings may be classed under three heads—namely, masonry construction, skeleton steel construction and reinforced concrete construction. The first of these methods, masonry construction, depending on solid walls, is practicable to a certain limit only. As has been mentioned before, the limit is usually about ten to twelve stories in height, for the reason that beyond that height too much valuable space is necessarily sacrificed to walls. According to a table prepared by Mr. F. E. Kidder, the city ordinance requirements for a 12-story building in New York is 40 inches thickness for the first story exterior wall. The building law of Boston requires 36 inches for the same wall; St. Louis, 34 inches; Denver, 30 inches; while Chicago is satisfied with 28. Truly, a great variation in the factor-of-safety.

On the basis of the New York requirements, a building 300 feet high would require a wall 7 feet thick, which practically puts a limit to masonry-constructed walls for skyscrapers on a 25-foot lot. So we may dismiss this method of construction from the skyscraper problem.

The first advance from masonry construction was the use of cast-iron columns, which were protected with fireproof coverings. But since the possibilities of steel construction became known very little use has been made of cast iron for columns. One reason for its disuse is the difficulty of making satisfactory tests of its strength, owing to the possibility of the shifting of the core in casting. My own experience leads me to be cautious in the use of cast-iron columns. In one instance the usual tests were made for thickness of shell, no defects were apparent, but later the same column fell off a wagon and broke in two, showing a bad flaw, thus saving my reputation.

When steel columns were first used in high buildings they were merely to support the floor loads, as in the World Building in New York. This building is 199 feet to the roof line, with self-sustaining brick walls, faced with sandstone and terra-cotta, the thickness of the wall being 11 feet 4 inches at the bottom and 2 feet at the top. The steel columns were let into chases in the wall in the lower stories and set free above. The next step in high building construction was the skeleton steel frame, in which all floor and wall loads are transmitted directly to the columns and by them to the foundations. The girders of each floor are calculated to carry the floor load and exterior curtain-wall for that story, thus eliminating the necessity of exterior wall except for protection from the weather. The thickness of these walls varies in accordance with the ordinance of different cities, and in all cases the walls are thicker than is necessary.

The Chicago building-law requires that the curtain-wall of a building 250 feet high shall be 12 inches thick for the first 150 feet from the top, 16 inches for the next 50 feet and 20 inches for the lower 50 feet. Mr. W. H. Birkmire, the well-known authority on steel construction, recommends lighter curtain-walls as being safe and reducing expense.

Time is saved by adopting skeleton steel construction for this class of buildings on account of the rapidity with which they can be erected. The Central Bank Building in New York, 75 by 150 feet, fifteen stories high and two below the sidewalk, was entirely completed in seven months.

The most essential part of the construction of a skeleton steel frame is the actual support of column. Other parts of the structure may be weak without causing more than local damage, but when a column fails the entire structure is liable to fall, and hence the greatest care of architect and engineer must be used in calculating stresses and framing columns and their connections.

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*Extract from a paper read before the Contemporary Club, of Davenport, Ia.

There are various shapes of built-up columns, each with some particular feature, all suitable for this class of construction and used at will by the architect, the design depending largely on the time limit under which manufacturers will agree to fill orders. Whatever structural shape is used, whether for columns, girders, floor beams, trusses or braces, actual tests have proved that the burning of the ordinary contents of a room will heat unprotected steel to a degree that will entail disastrous results when a stream of water is thrown on the heated metal. This fact renders it absolutely necessary to encase steel in non-combustible material.

When we speak of a fireproof building we use the term relatively, since the expense of an absolutely fireproof building is too great to admit of general use. Buildings constructed so as to secure a salvage of 60 to 80 per cent. are considered fireproof. It is not necessary to discuss the various fireproof materials, for the Baltimore fire proved cement is the best fire-resisting material.

While concrete has been used in building for centuries, and steel framed structures have become common, a new method of construction has come into use by the combination of these two materials, steel and concrete, in what is known as armored or reinformed concrete. The earliest record of reinforced concrete mentioned by Mr. Kidder is the invention of P. A. J. Monier, a gardener of Paris, in 1867. In 1869 Francois Coignet, of Paris, secured a patent on a combination of iron and concrete. In 1875 W. S. Ward constructed a building near Portchester, N. Y., in which not only all the exterior and interior walls, cornices and towers were constructed of concrete, but all of the beams and roofs were exclusively made of concrete reinforced by light iron beams and rods.

European engineers have done more with reinforced concrete than American engineers, for the reason that our steel plants have produced structural steel of such excellence, the use of concrete has been neglected until within the last few years. While reinforced concrete has been used for some years for bridges and other engineering work, the first skyscraper to be built of this material was the Ingalls building, of Cincinnati, Ohio, begun in the fall of 1902 and designed by Elzner & Anderson, Architects.

From experiments with concrete and steel made by M. Considere, Capt. John S. Sewell, U. S. Engineer Corps, and others, and the exhaustive tests at Watertown Arsenal, we learn many interesting facts. One of the latest investigators, Mr. J. W. Schaub, makes the statement that if a rusty bar of iron is inserted in concrete mortar for fifteen to twenty days it will be found free from rust, due to the iron giving up its oxygen to the cement. He adds: "The cement being anhydrous and alkaline in its reaction, will prevent the formation of rust, so that a coating of cement mortar should be, from a chemical and physical standpoint, an absolute protection against rust."

While engineers are making these and other tests with many different assumptions and empirical formula, we are impressed with the lack of uniformity in the factor-of-safety. We are impressed with this lack in all structural designing. In ordinary construction, such as we have to deal with in a city of this size, it is the writer's custom to take the average given by available authorities. This should not be necessary and could be avoided if all tests of strength of materials were made and formulated under government inspection. It has been shown that steel reinforcement prevents shrinkage of the concrete and greatly adds to its tensile and compressive strength. Further advantages of reinforced concrete are its cheapness of construction in comparison with structural steel and its fireproof quality. This last characteristic was thoroughly tested in the late Baltimore fire. After the fire, interest centered in a small four-story brick building, with a cast-iron front, the interior of which had been remodeled shortly before the fire, the exterior walls had been retained while the new columns, girders and floors had been constructed of concrete steel. The exterior walls were found demolished, but the interior walls were intact, except where injured by falling walls, proving beyond doubt the fireproof qualities of concrete construction. Another advantage of concrete is that ornaments and other details can be moulded of it.

There are many systems of reinforced concrete, the variation being due to the different forms of steel reinforcement. That in the Ingalls Building, mentioned above, is of cold-twisted square bars, used throughout. This system greatly increases the tensile strength of the bars after twisting and increases the mechanical grip of the bar on the concrete. The Ingalls Building is 50 by 100 feet on the plan, sixteen stories high, 210 feet above and 20 feet below the sidewalk to bottom of foundations. The entire structure is reinforced, consisting of steel bars inbedded in concrete with their ends interlaced, making a concrete monolith. The exterior walls are faced with marble for the first three stories, glazed gray brick for the next eleven and glazed white terra-cotta for the last story and cornice. The foundations are all of reinforced concrete.

In New York City, when it is necessary to go to great depths for foundations, the pneumatic process is successfully used. In Chicago a system of grillage, on piles, of I-beams and concrete, has been in use for several years. And now that reinforced concrete piles are available, and do not have to be cut off at the water-line to prevent decay, we have a fireproof, windproof and practically indestructible building as the result.

In view of the possibility of conflagrations liable at any moment to temporarily jeopardize the business interests of every city, it is necessary that the requirements for materials and construction of buildings in such districts should be most rigid. It should be made a criminal offense to erect a building that is not fireproof in congested business centers.

The business interests are not the only interests to be safeguarded. Thought should be given to the aesthetic side of a city's life and provision made for it. There should be in force in every city laws regulating the height of buildings. European cities, backed by centuries of art training, regulate the height of buildings on purely aesthetic grounds.

When we consider the last division of our subject, the aesthetic of the skyscraper, we must remember that our aesthetic training is based on the proportions of Classic architecture—the low buildings of the Grecian archipelago. We are appalled at the seeming hopelessness of reconstructing our aesthetic ideas on such a gigantic vertical plane as a skyscraper demands. It may be said that architects have had a vertical problem to deal with before, in the Gothic cathedral. That is true, but the conditions are entirely dissimilar, there was a proportionate breadth at the architect's disposal.

Many of the skyscrapers are on lots so narrow in comparison with their height that little remains to deal with but a vertical streak, as in the acute angle of the "Flatiron" or Fuller building of New York. Attempts have been made to reduce the apparent height of these buildings by the use of repeated horizontal lines. The result of such treatment is seen in pronounced form in the St. Paul Building in New York. Here the designer has grouped two stories together and piled section on section in monotonous uniformity until the client's money-limit was nearly reached, when, in a sublime effort, three stories are grouped above a sub-cornice and his attempt is finished—a procedure, as one writer puts it, "Quite as sensible as if a man were to thrust his head through the crown of his hat and wear it below his head in stead of above it."

Various other styles of high office buildings are seen. Few are satisfactory in appearance. Their designers strive for effect by dividing the facades horizontally and vertically. Pretentious detail runs riot. All our architecture needs restraint, needs a more refined sense of proportion—a more conscientious use of detail.

There are a few skyscrapers which are designed in a rational way, their architects realizing that the problem is one of vertical design and treat it accordingly, not even attempting to work out the design in any of its existing architectural styles. The original Monadnock Building in Chicago, designed by Mr. John W. Root, is one of the best examples of good design in skyscrapers. It is a building of the severest plainness. The necessary strength of base is secured by a gentler outward curve above the first story, an effect of batter being secured by champfering up the angles, widening as it rises several stories in height. The superimposed stories have plain, rectangular openings. The expanse of blank wall is broken up by shallow oriels, equally spaced, starting above the outward curve of base, at top of second story and extending to the story below the frieze line.

The cornice is formed by repeating the gentle curve of the base. The proportions of this building are so carefully studied that in spite of its austerity it is one of the most pleasing and satisfactory of skyscrapers. The pleasing effect of the building could have been heightened by using a lighter colored material, the dark-colored brick and terra-cotta being almost too somber for such a massive structure.

Among other skyscrapers of successful design there are but two I shall mention as being exceptionally satisfactory. One is the Schiller Building, of Chicago, designed by Mr. Louis H. Sullivan, and the other is the preliminary sketch for the Times Building, New York, by Mr. Cyrus L. W. Eidlitz. This sketch is Gothic and of unusual charm. Unfortunately, the design was modified in construction.

While we have a few individual examples of fine design the problem of effective treatment of the skyscraper is one still open to solution.

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American Society of Civil Engineers

THE American Society of Civil Engineers assembled in annual convention in New York on January 17, 1906.

The Board of Directors submitted an interesting report, showing that there are now 12 honorary members, 2 corresponding members, 1,952 members, 1,021 associate members, 131 associates, 396 juniors and 25 fellows, a total of 3,539, or a net increase of 336 during the last year. Local associations of members of the Society have been organized in Kansas City, Memphis and San Francisco. The report also alludes to the extension of the Society house, which has been accomplished by the purchase of an adjacent lot and building thereon, a three-story addition. The effect of this addition is to make an enlargement of 50 per cent in all the working rooms of the building. The comfort to members provided by this extension was amply shown by the method in which the largest attendance at an annual meeting was successfully handled.

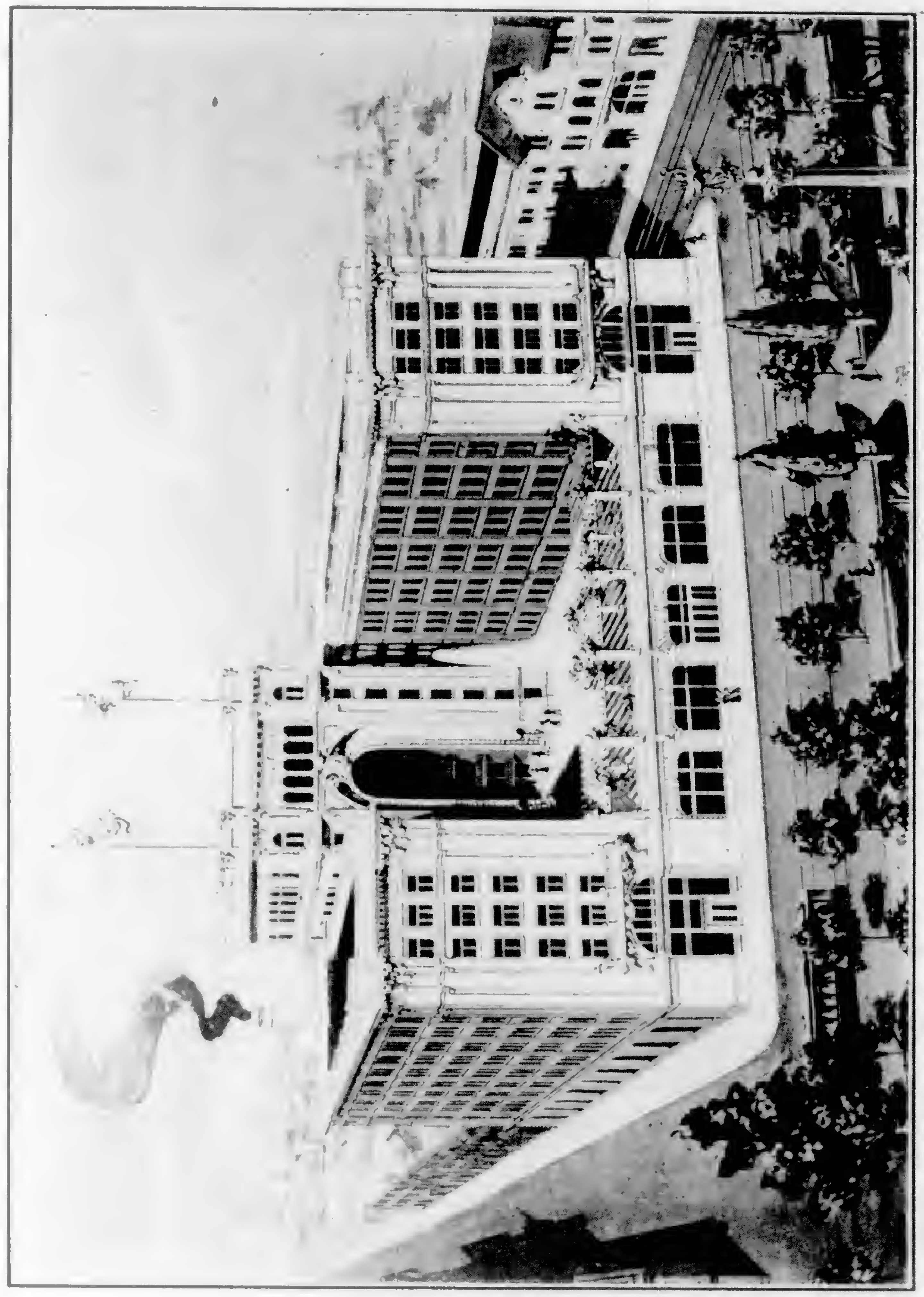
Considerable time was taken up in the discussion of proposed amendments widening the scope of membership and by some change in the description of required qualifications, and the matter was closed by being referred to a committee of five corporate members, one associate member and one junior member, to be appointed by the president, with instructions to report at the next annual convention.

The convention was marked by the largest attendance ever present at any of the conventions in New York, and the receipt on the first day, and the smoker on the evening of the second day fully taxed the increased capacity of the building. Admirable arrangements were in force for the seating of all present during the collation hours, the members being able to enjoy the spread in comfort.

The boat excursion through the Brooklyn Navy Yard and the Bush Terminal Company's plant started in rain and fog on a most discouraging morning, much to the sorrow of some of the less courageous ones who backed out owing to the bad weather. Those who stayed by the boat had a most enjoyable trip and returned amid brilliant sunlight.

Frederic P. Stearns, the well-known engineer of the Metropolitan Water Board of Boston, was elected President for the year: Onward Bates and Bernard R. Green were elected Vice-Presidents; Joseph M. Knapp was elected Treasurer, and Wm. B. Storey, Jr., James M. Johnson, Wynkoop Kiersted, Emil Swensson, J. Waldo Smith and George Gibbs were elected directors.

Detail of First Church of Christ, Scientist, Oakland *Henry A. Schulze, Architect* C-366



The U. S. Grant Hotel, San Diego, Cal.

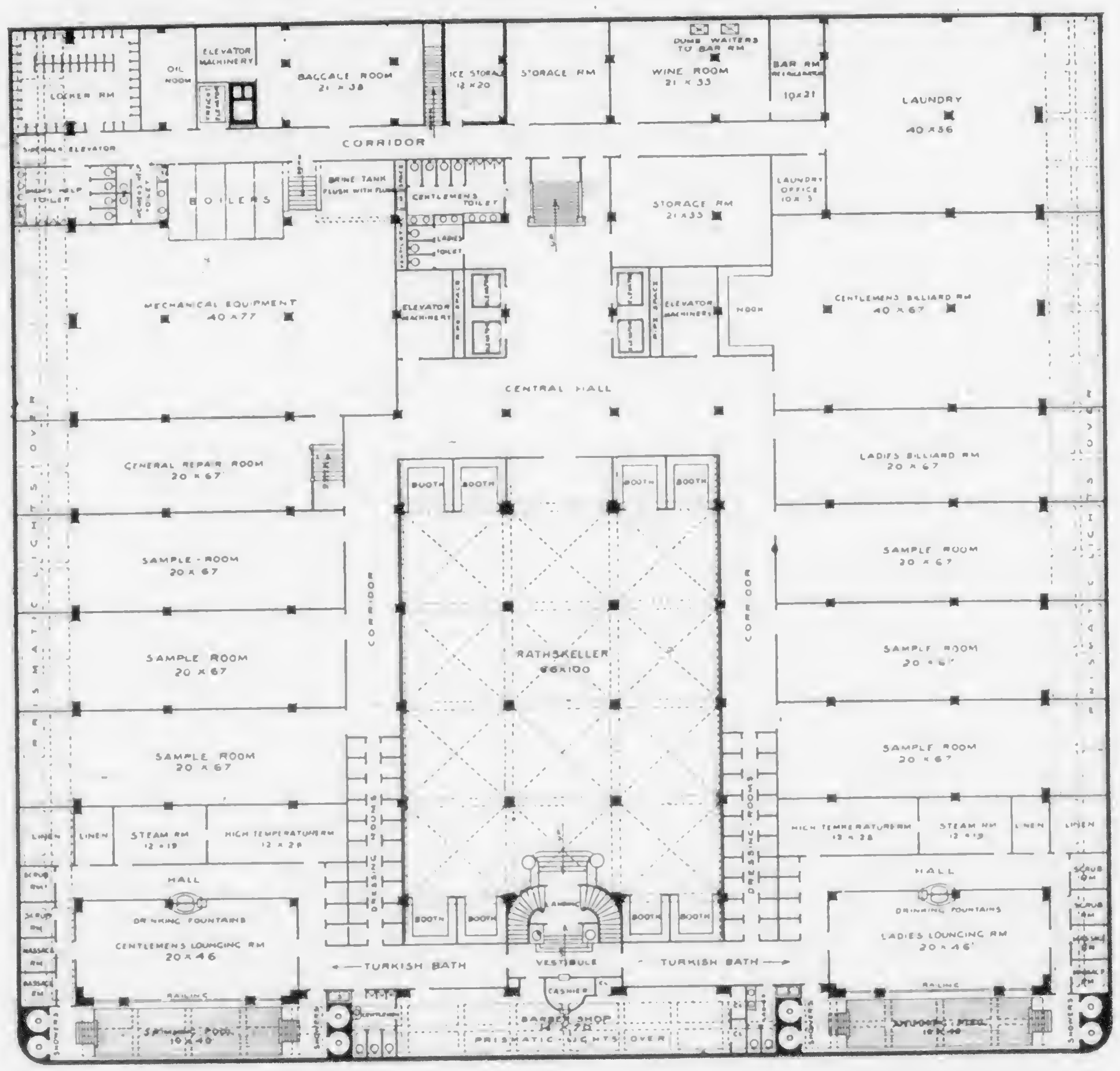
Harrison Albright, Architect C-367

San Diego's New Hotel

U. S. GRANT, JR., son of the distinguished general, is to build an immense hotel in San Diego that will be unique in that the material to be used will be reinforced concrete. The hotel will be 200 x 200 feet and will occupy the site of the old Horton House. Harrison Albright is the architect.

Above ground the building will be in the form of the letter E, and in the six stories which comprise this part there will be 400 bedrooms and 200 bathrooms, each bedroom having access to adjoining bedroom and bathroom, and each bedroom containing clothes closet, lavatory, radiator and long-distance telephone.

The basement will extend to street curb, and will contain rooms for mechanical equipment, consisting of the following plants: Heating, lighting, refrigerator and laundry. It will also contain rathskellar, billiard rooms for both ladies and gentlemen, barber shop and fifteen commodious well-lighted sample rooms for the use of commercial men.



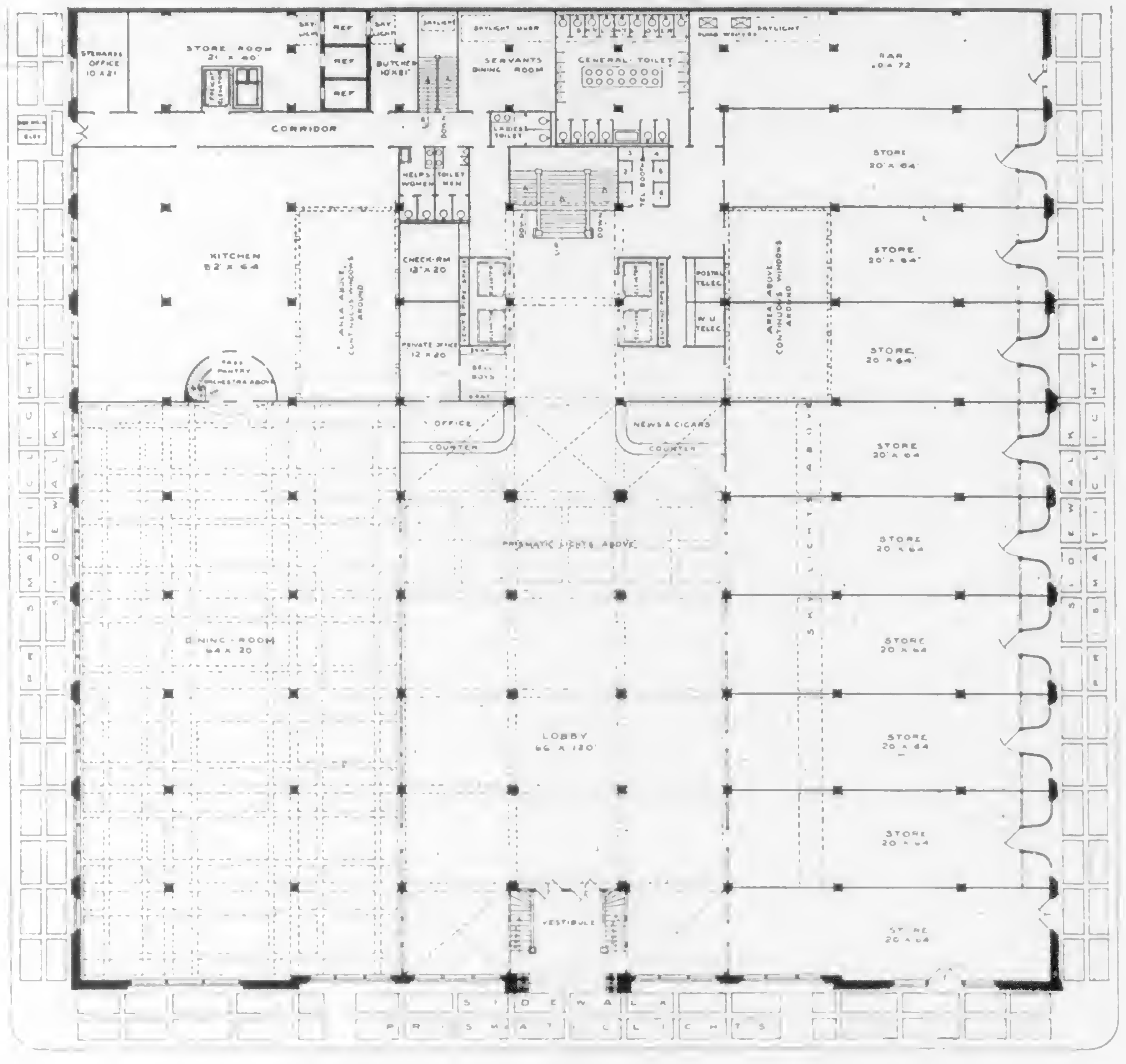
BASEMENT — PLAN
U S GRANT- HOTEL - SAN-DIEGO; CAL

U S GRANT JR OWNER
SAN DIEGO CAL

HARRISON ALBRIGHT- ARCHITE
HOMER-LAUGHLIN-BLDG LOS ANGELES

SCALE 16 FT TO THE INCH

C 368



First Floor Plan, U. S. Grant Hotel, San Diego, Cal. C-369

The central portion of the first floor will be occupied by a lobby 66 x 172 feet, the rear portion of which will be subdivided into office, private office, telegraph and telephone rooms, news and cigar stand, checkroom, public lavatory, writing rooms, etc. To the left of the lobby will be the dining-room, 66 x 100 feet, kitchen, 56 x 72 feet; steward's office, storerooms, refrigerator rooms, etc. To the rear of the lobby will be the bakery and dining-rooms for officers and servants. To the right of the lobby will be a cafe 30 x 90 feet, barroom 30 x 66 feet and seven stores, each 20 x 66 feet, all of which will have entrances from Fourth street and lobby.

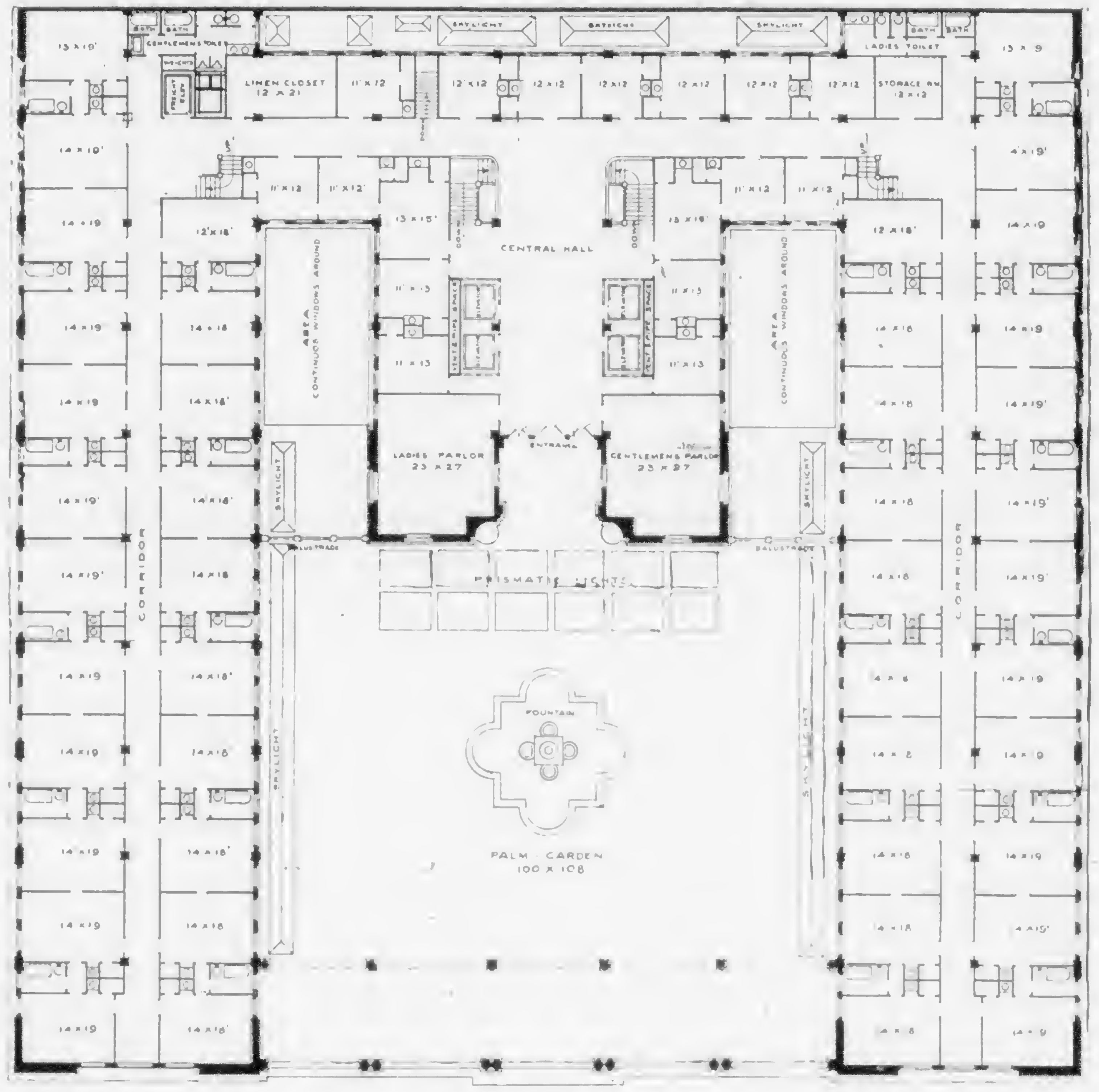
The eighth floor will contain ballroom 60 x 66 feet, adjoining which and opening therefrom will be lounging, toilet and checkrooms for both ladies and gentlemen.

The open space on the second floor, between the two wings, 100 x 112 feet, will be devoted to a palm garden, the entrance being under the great arch between the ladies' and gentlemen's parlors, both of which overlook the palm garden, the "Arch of Welcome" at the rear of the palm garden, the Pergola in the front of it and the fountain in the center are features that will linger long in the minds of those who visit the hotel.

The footings, columns, girders, floors, walls, etc., will be constructed of reinforced concrete. The exterior of the building will be faced with cream-colored glazed terra cotta. The floors of the lobby, cafe, barroom, toilet rooms

and bathrooms will be Mosaic tile. The floors of the billiard rooms and ballroom and parlor will be wood Mosaic. The floors of all other rooms and corridors will be cement, with fastenings for carpets embedded therein. The walls of all the rooms throughout the entire building will be decorated.

There will be four high-speed passenger elevators, one freight elevator, two sidewalk lifts, all of which will be operated by electricity.



Second Floor Plan, U. S. Grant Hotel, San Diego, Cal. C-370

Concrete Resists Fire

Reinforced concrete has great fire-resisting qualities.

After the Chicago conflagration a commission investigated the comparative fireproof qualities of materials in the ruins and reported in favor of the same in the order named—concrete, brick, stone.

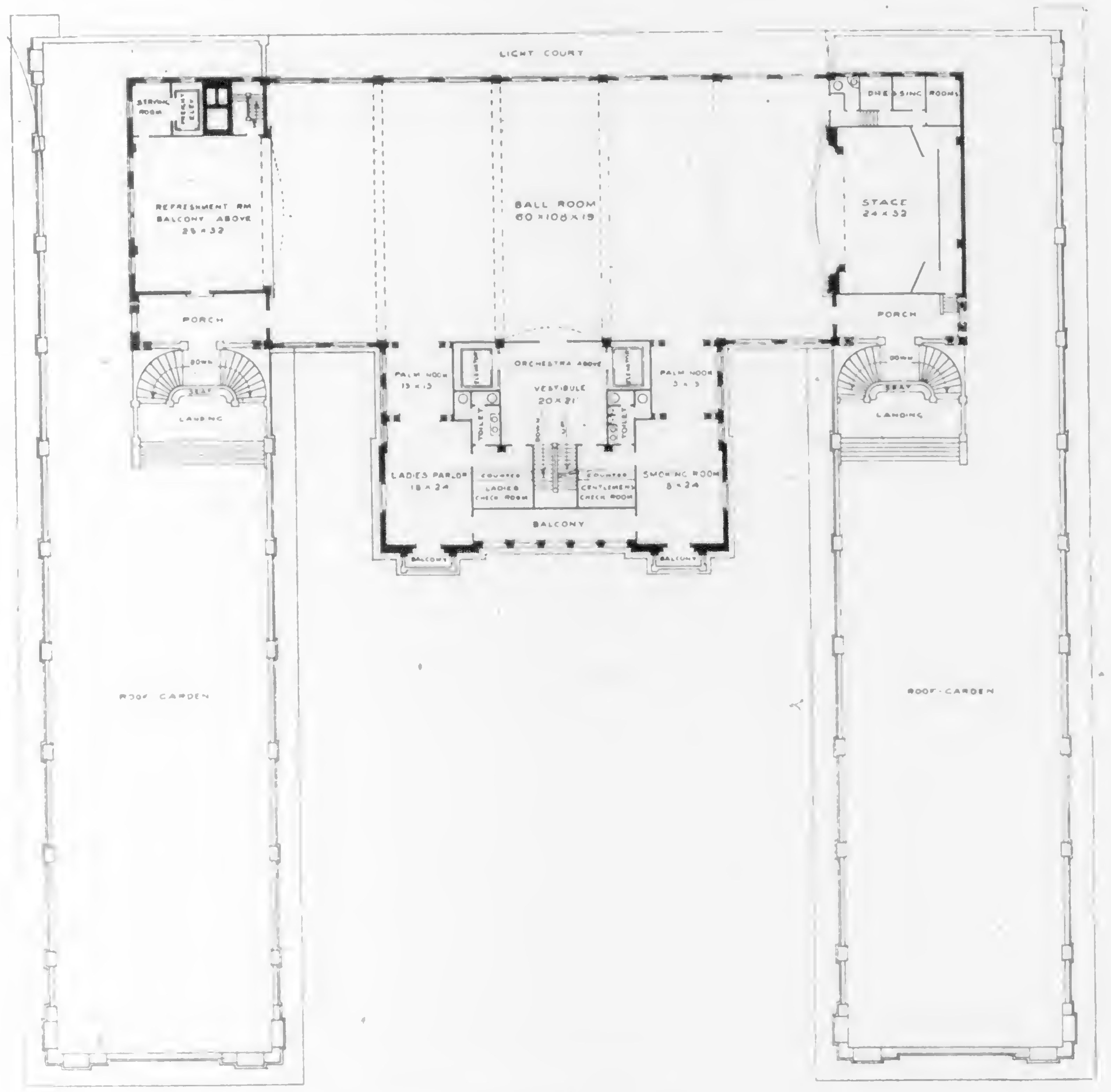
The conflagrations in Boston, Baltimore and Rochester swept streets of granite blocks into ruins more quickly than if they had been of wood. Sheets of flame spread over ranges of granite warehouses, slate flew into fragments, iron columns, girders and beams warped and bent, while the granite blocks cracked, tumbling the so-called fireproof piles into heaps of ruins.

Probably no better and certainly no more expensive and thorough tests could have been devised than those in Baltimore in connection with the United

States Fidelity and Guaranty Company's building and the International Trust Company's building, both of which were built entirely of reinforced concrete under the Hennebique system.

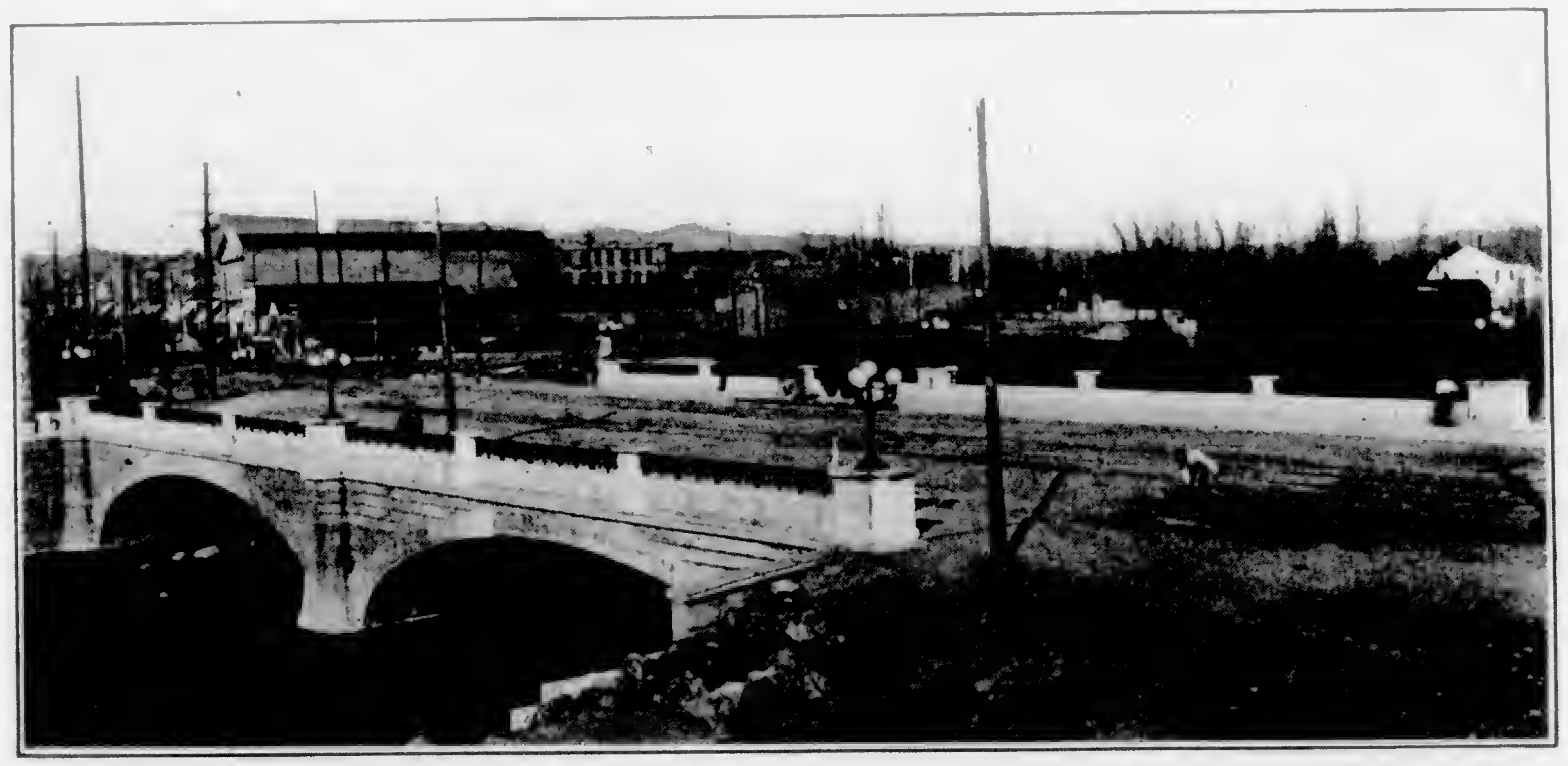
In connection with the International Trust Company's building, the first floor, supported by concrete columns, and the mezzanine floor, extending only in the rear, also supported by concrete columns, sustained perfectly the fall of the Adams Express Company's building which adjoined it. The Adams Express Company's building was six stories high, and the fire having gutted it, the side walls fell on the large skylight of the International Trust Company's building, crushing it and reaching the concrete floors with a tremendous force, but without injuring them. These floors so protected the vaults that their contents were removed undamaged, and tests of the floors showed that they had not been weakened by the fire or by the fall of the adjoining building.

The buildings referred to were in the center of the region of the most intense heat in which granite, stone, brick and tile were entirely destroyed. They were absolutely fireproof against the fire and are today the best examples of truly fireproof structures.



Ninth Floor Plan and Roof, U. S. Grant Hotel, San Diego, Cal. C-371

Cement and Concrete



Reinforced Concrete Bridge, Reno City, Nev. *John B. Leonard, Engineer* C-372

The Reno Reinforced Concrete Bridge

By W. P. DAY

WITH the development in the west of reinforced concrete as a structural material has come its application to the arched bridge, and its adaptability to this type of structure is becoming a recognized fact. With its use in this connection comes durability, strength and a general pleasing appearance to the eye, and this latter condition, especially in city bridges of the type with which this article intends to treat, is one which must be striven for by the successful bridge designer.

While it is true that the first cost of a reinforced concrete arch is a little greater than that of a steel bridge for similar conditions, a proper treatment of maintenance expenses for, and a determination of the life of, a steel bridge, is convincing evidence of the superiority of masonry construction over that of steel.

With these facts before them the Reno board having in charge the contemplated bridge, called for competitive designs for a structure to span the Truckee river, on Virginia street, in the city of Reno, Nev. After considerable deliberation the board accepted the design of Mr. Jno. B. Leonard, a consulting engineer of San Francisco, and with whom the writer had the good fortune to be associated. The contract for the construction of Mr. Leonard's design was awarded to Cotton Bros. & Co., contractors, of Oakland, Cal., and they have but recently completed the work.

The bridge, as it stands, is composed of two spans of 61 feet 6 inches in the clear; the center pier is 9 feet wide at the top and 10 feet at the bottom, resting directly on large boulders packed with gravel. The distance, center to center of railings, is 80 feet, divided into 12-foot sidewalks, one on each side, and a roadway of 56 feet. The sidewalks are supported by transverse walls which, in turn, are supported by the rib itself. The outward thrust of the earth is taken by light spandrel walls reinforced with ¾, ⅝, and ½-inch corrugated bars placed horizontally, and ½-inch vertical bars, spaced 2 feet, the latter of which serve to distribute the stresses upon the former. The spandrels are held in place by reinforcing each of the walls supporting the sidewalks with three ⅞-inch bars placed diagonally; the transverse walls then have two functions—they support the sidewalk slab and act as buttresses connecting the spandrel walls to the arched rib. The arch rings have a clear rise of 11 feet, the concrete being 2 feet thick at the crown and 3 feet 6 inches at the haunches. Both the extrados and intrados are five centered, the rib bending in abruptly at the springs. The designer was confronted with the problem of making as large a waterway as possible, and this condition made necessary the choice of a rib approaching the ellipse in shape.

The reinforcement of the arch proper consists of 1-inch bars spaced 6 inches near the extrados at the springs, and ⅞-inch bars spaced 6 inches near the extrados at the crown. Near the intrados at the springs 1¼-inch bars are spaced 6 inches and ⅞-inch bars are spaced 6 inches near the intrados at the crown. These bars are interlaced with ½-inch bars at intervals of 2 feet, both at the extrados and intrados, and, as in the spandrel walls, the ½-inch bars serve to distribute the stresses upon the main reinforcement.

The sidewalk slab is 3½ inches in thickness and is reinforced with 16 gauge expanded metal. The slab is carried by sidewalk beams resting upon the buttress walls and reinforced with five ⅞-inch bars and five ¾-inch bars respectively. The sidewalk beam nearest the roadway is finished with a 6 x 4 x ⅜ angle to form a curb, the latter being anchored to the masonry by ¾-inch bolts bent into the beams and countersunk in the angle.

The contractor was permitted to use his own devices for supporting the forms, it being specified only that the maximum fiber stress in bending be 1,400 pounds per square inch; for bearing, 300 pounds per square inch; and for shear, 100 pounds per square inch.

The concrete for the different portions of the structure was prepared in the following ratios:

For the portions of the foundation below the reinforcement members, 500 pounds of cement to 11 cubic feet of sand to 26 cubic feet of stone; for the arch spandrels and wing walls in the ratio of 680 pounds of cement to 14 cubic feet of sand and 21 cubic feet of broken rock. This latter proportion was used also in the railings and sidewalks, but the maximum dimension of broken rock for the concrete for these parts was limited to 1 inch. In placing the concrete for the abutments, it was considered good construction to use large boulders, which were easily obtained close by. Golden Gate cement was used throughout the entire work.

Drainage was provided for by three sets of 4-inch pipes—three to the set,—extending from the spandrel fill to the inside of the rib.

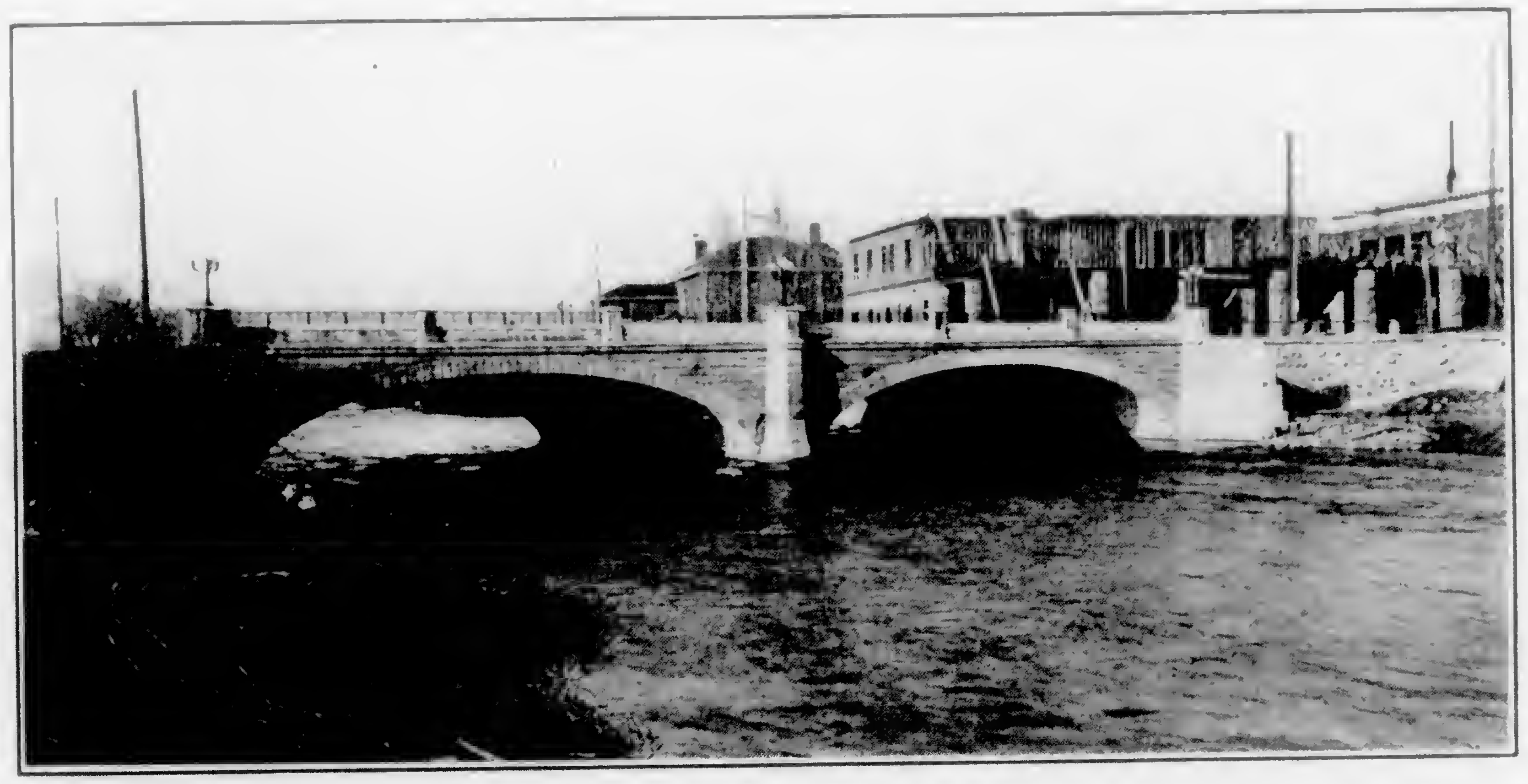
The Reno bridge is a monolithic structure and contains 2,200 cubic yards of concrete and 115 tons of steel. The reinforcement throughout consists of corrugated bars with an elastic limit of 50,000 pounds per square inch. The architectural features are fully shown in the illustrations. While many bridges of this type have been built in Europe and in the east, the west has been slow to recognize their adaptability. The successful construction of the Reno bridge, however, seemed to point out the economy of the more durable structures, and it was followed in quick succession by three reinforced concrete bridges in California, one of which, the Pollasky bridge, was described in a previous issue of this journal.

* * *

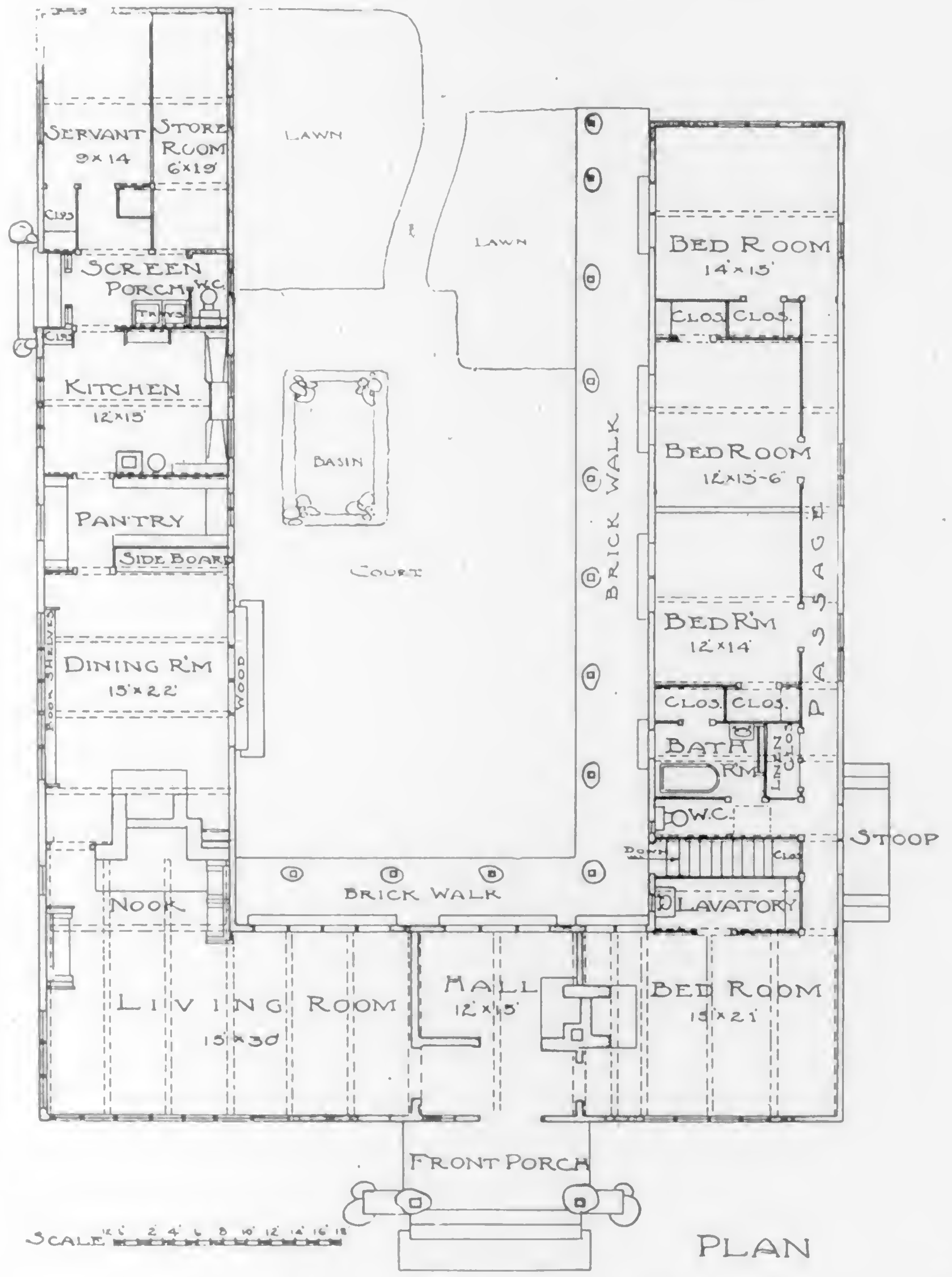
Indian Architecture

IN AN article in the Manchester Guardian under this heading, "F. M. S.," Professor Simpson says:

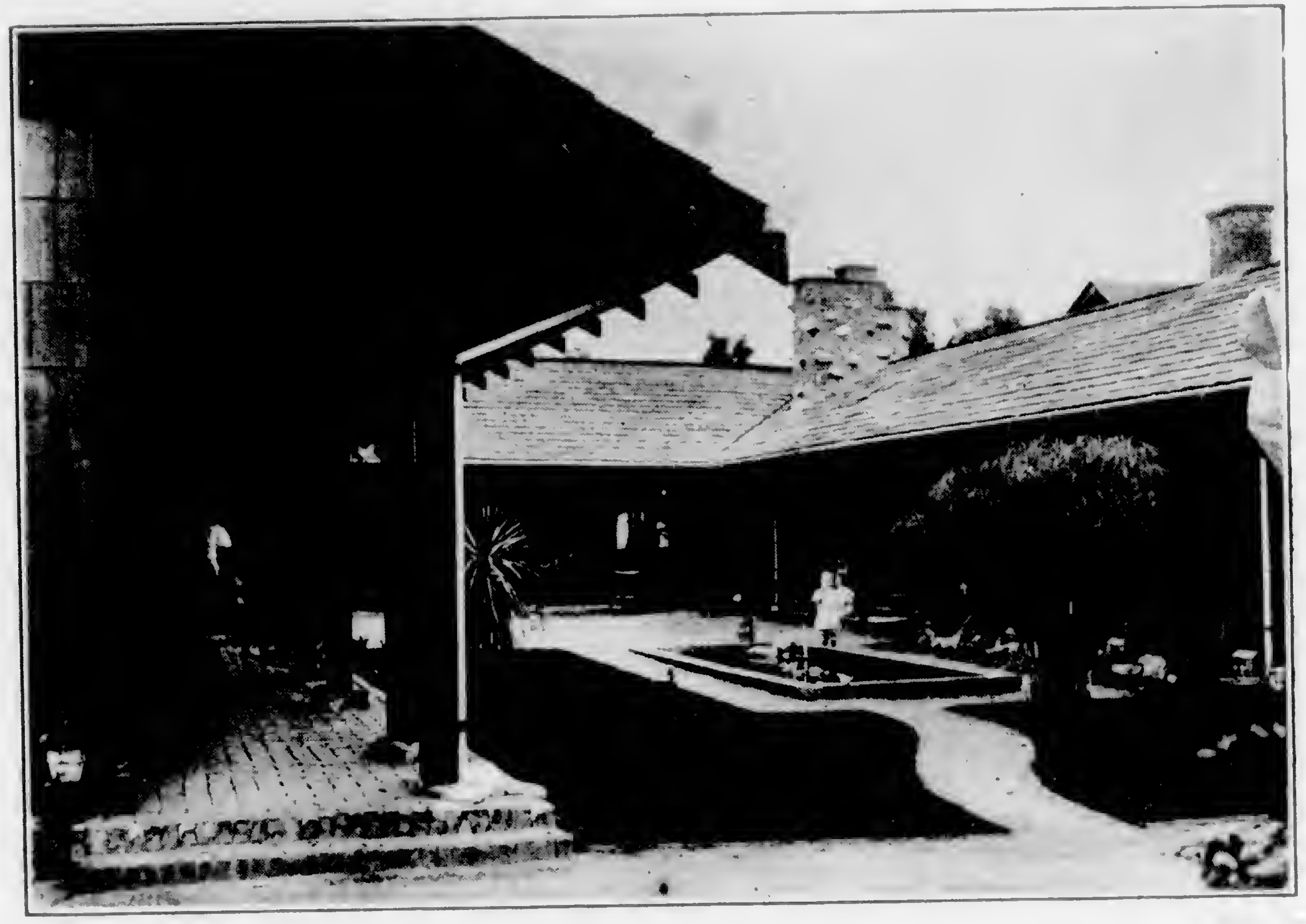
"In Indian architecture the buildings of some races are all lintelled, whilst others are arched and domed. 'An arch never sleeps,' says the Hindu proverb, and the Hindu, therefore, doubts its stability and leaves it severely alone. He spans his openings by beams—by a single one if the space be narrow, by many if it be of considerable width. In the later case the beams are placed one on top of another, and each in turn projects in front of the next below, like a bracket. He does not object to the shape of the arch, or at all events he did not in the past. On the contrary, he used the form frequently when building in stone. But his arch is not a true arch. He laid his stones, as he laid his beams, horizontally. In the north of India there are many Hindu domes, and one would have thought that these would have been built as the Byzantines built them, and as we build them now. But no: the same principle of beam on top of beam—in this case they cross one another, generally diagonally—is followed, until the opening at the top is sufficiently small to be closed by a single piece of stone. The Mahometans built quite differently. A mosque was not a mosque, a tomb not a tomb, unless it had an arch in it. For some time they were dependent on Hindu labor, and their arches, although of Saracenic form, are built in Hindu fashion. But about the middle of the fifteenth century they learned to build more correctly, and many of their subsequent arched openings are amongst the largest and finest in existence. Moreover, they built domes which can hold their own with any in Europe. The dome over the tomb of Mahmud at Bijapur is 135 feet in diameter, practically the same width as the dome of Florence Cathedral. But the Florentine dome and the wall below it are the same in plan, octagonal, whereas the Indian dome is a circular one placed above a square. The difficulties of construction were thus increased enormously, and the manner in which they were overcome in both beautiful and ingenious."



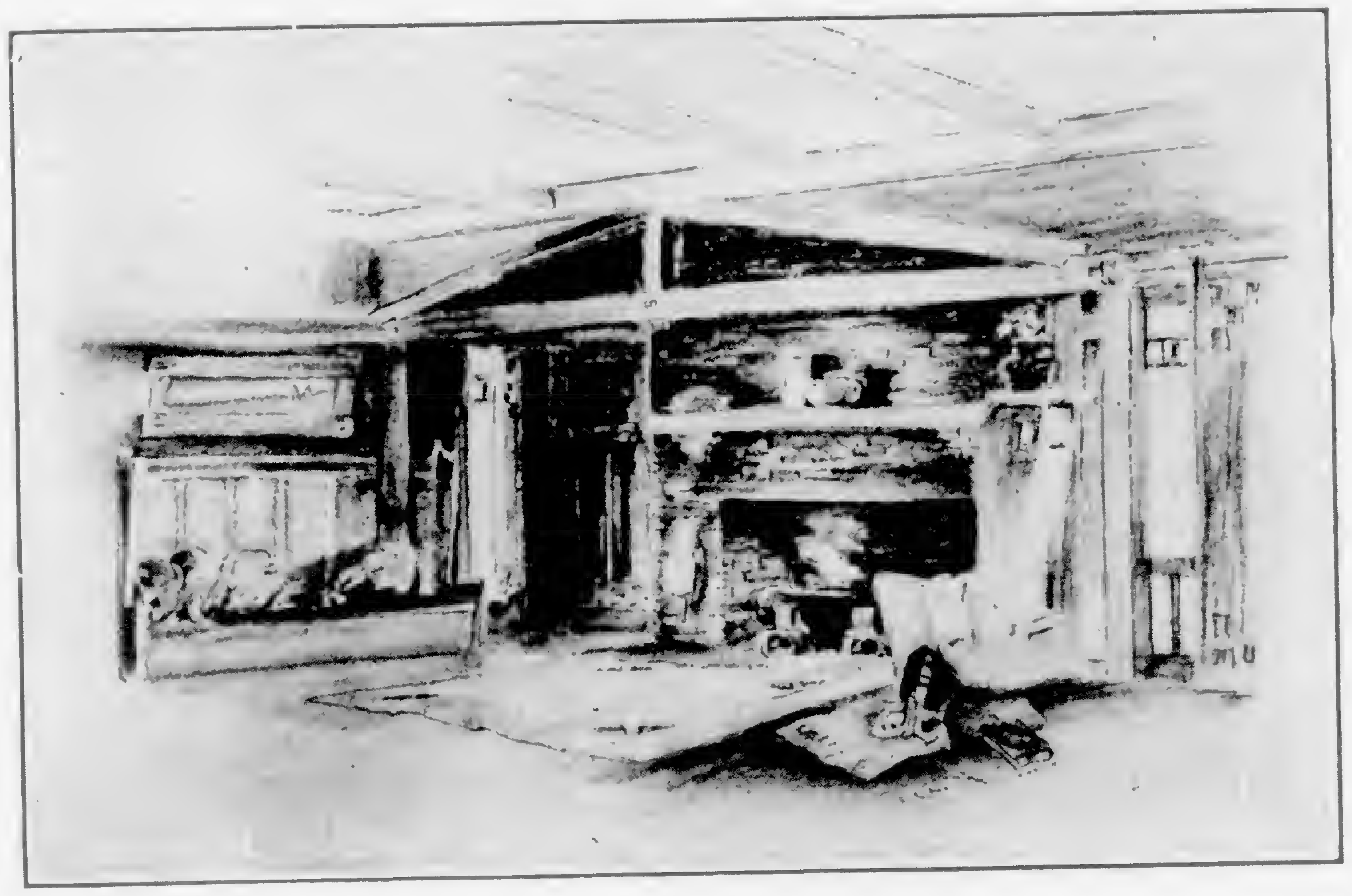
Another View of Reinforced Concrete Bridge, Reno City, Nev. *John B. Leonard, Engineer* C-373



Floor Plan of Court Residence of Mr. C. W. Hollister, Hollywood C-374



Court Residence of Mr. C. W. Hollister, Hollywood Greene & Greene, Architects C-375



Living Room in Court Residence of Mr. C. W. Hollister, Hollywood C-376

Steel for Reinforcements

By A. L. JOHNSON, M. Am. Soc. C. E., St. Louis, Mo.

THE history of the origin of reinforced concrete has been published so often that the speaker will not enter into this part of the subject further than to say that he thinks too little credit has been given to Thaddeus Hyatt, an American, for the work he did in the year 1876 and 1877 in England. He made numerous tests of reinforced concrete beams at Kirkaldy's laboratory, reinforced with bars of different patterns and arrangements, developing at this early date the advantages of stirrups, of having them connected to the bar, of bending bars up at the ends for shearing provision in short beams, ical bond, though his investigations here did not enable him to learn the criteria for differentiating the efficient from the non-efficient.

Up to the time of Hyatt very little work in reinforced concrete had been done abroad, other than in tanks, vases, pots, etc., in which the section was entirely in tension, and in which, therefore, there was little tendency for different movement on the part of the metal and the concrete, such as occurs in reinforced concrete beams. Neither had there been anything of consequence in the United States, about the only instance now known being a building constructed entirely of reinforced concrete by Ward in 1875, in the State of New York.

Ransome made some experiments in San Francisco on reinforced concrete beams, and on September 16, 1884, received a United States patent on a floor construction of concrete reinforced with square bars twisted, claiming as advantages over plain material an increase in tensile strength and a more secure bond. Later, he applied for and secured a patent on a triangular twisted bar, the contention for patentability being that this bar would not split the concrete ribs in which the bar was enbedded, owing to the deeper cupping that would be obtained in the triangular type. Mr. Ransome's theory of the splitting action noticed is explained in the patent as follows:

Assuming a Tee beam, or ribbed floor construction, in which the rib is reinforced with a steel bar, when the floor is loaded, the bar being bent up at the ends, it is as if the rib were held up by the bar, or sitting on the bar. If the floor is loaded to, say, 400 pounds per square foot, and the ribs are, say, 3 feet apart, then there is a vertical load of 1,200 pounds on top of the rib for each foot of length. Hence, the rib acts as a column, being supported on the bar at the bottom. As the bar is narrow, there is a tendency for the concrete to flow each side of the bar, or, in other words, there is a movement of the concrete above the bar, crosswise of same. In a plain bar there would be no obstruction to the movement. In the square twisted bar there was not, according to Mr. Ransome, sufficient obstruction to the movement, as the cupping was not sufficiently deep. Hence the superiority of the triangular type.

The above theory was, of course, fallacious, and the type never came into commercial use. The vertical load on the rib for any given length is carried by vertical shear in the concrete, and the rib is not acting as a column at all. If it were, in the case mentioned where the rib carried 1,200 pounds per lineal foot, supposing the rib to be 4 inches, this would only give a compressive stress in the rib of 25 pounds per square inch, and would be too small to be noticeable even if many times this amount.

The ribs do not act as columns, but as beams, lengthening on the bottom and shortening on top, and it is the movement of the concrete lengthwise of the bar which the bar must be calculated to resist, and it is in this resistance that it begins to help carry the load and become an integral part of the structure. To offer reliable and satisfactory resistance to this movement of the surrounding concrete along the bar, it is necessary for the bar to have on its surface projections, or depressions, the sides of which are nearly at right angles to the direction of the movement, which is to say, to the bar itself. It is not necessary that the sides of these ribs or depressions should be exactly at right angles to the bar to develop this efficiency, however, it being possible to vary therefrom an amount equal to the angle of friction between the concrete and the metal, which, on the average, will be between 30 and 45 degrees. But if the surfaces against which the concrete presses are nearly parallel to the direction of the movement, we have the same action as when an ax is forced into a block of wood, a very heavy splitting component resulting, which may be many times as great as the direct force itself, similar to the action of a toggle joint.

Of course, this splitting action is of little effect until after the so-called adhesion of the concrete to the surface of the metal has been overcome. This adhesion is not really adhesion at all in the sense that two pieces of wood may be made to adhere to each other by means of glue. The appellation has been given to the resistance of a bar against withdrawal from a block of concrete. As a matter of fact, this resistance is made up of two parts, friction and a mechanical bond caused by the entering of the cement particles into microscopical pores on the surface of the metal, which particles have to be sheared off in withdrawing the bar. For short depths of embedment these two forces amount to about 500 pounds per square inch of bar surface for bars of ordinary mill surface and for good concrete, where perfect union exists between the cement and the metal. Of this, friction contributes about 25 pounds per square inch, the remaining 475 being due to the mechanical bond. There is therefore no reason in advocates of plain bar reinforcement decrying mechanical bond, inasmuch as the plain bar has really no value not contributed by this same quality. The bond, it is true, is of a microscopical nature, but nevertheless its value is considerable, and if it would remain intact we could design and execute reliable concrete structures with plain bar reinforcement.

There are a number of things, however, tending to impair a bond of this nature, amongst which we may mention the following:

1. Shocks and vibrations continued through years of service are liable to injure, if not wholly destroy, the bond, and have done it in cases under the speaker's own personal observation.

2. Where the concrete is continually wet, the adhesion will be cut down from 50 to 60 per cent. in less than one year, as indicated by the experiments of Brueillie.

3. The development of the working stress in the metal slightly stretches same, and the cross section is therefore slightly reduced. Suppose the metal has a working stress of 15,000 pounds per square inch, then the proportionate elongation is .0005, and the decrease in the diameter is, with practical exactness, one-half this, or .00025, a quantity which, though small, could be readily measured by an ordinary micrometer, and certainly is far from microscopical.

The advisability of reinforcing bar with a more positive grip on the concrete than that afforded by the roughness of the mill surface of a plain bar, which is, of course, very slight, is not entirely due to the necessity of maintaining continuously the strength of the beam, but also to the necessity of keeping the bars from being exposed to the atmosphere.

We know, now, that in a reinforced concrete beam cracks begin to form in the concrete on the tension side, at an elongation which gives a stress of from 12,000 to 15,000 pounds per square inch in the bars, which is at just about, or even a little below, the working stress usually employed. If plain bars are used these cracks will be far apart and correspondingly large, while if a bar is used having a positive grip on the concrete for every inch of bar, there can be no accumulation of cracking tendency for a considerable length, but there will be a great many cracks, mostly invisible to the naked eye, until the metal has passed its elastic limit. Such cracks will not be injurious, while the cracks that form with the plain bars might. They amounted to considerable in the tests made about five years ago by M. Considere, as a result of which he reported the wonderful stretchability of reinforced concrete that misled us all for some time. In these tests he bent the beam several hundred times, so that the tension fiber had been stretched from 15 to 20 times as much as plain concrete would stand, then cut a piece 8 inches long out of the middle surrounding the ¼-inch round rod that he used for the reinforcement, and then with great pains and labor cut the rod out of this 8-inch piece of rectangular section, leaving a hole through same from end to end. Now this concrete had been stretched, according to M. Considere, many times as much as plain concrete would endure, but instead of falling apart when the rod was finally gotten out, it was perfectly intact, and he put it on supports, loading it in the middle, and obtained as much carrying capacity as he could have secured with the same kind of concrete which had never been subjected to such severe usage. This seems like proof positive of M. Considere's conclusion. But it developed later that he had taken this 8-inch specimen from between two cracks of considerable size, and that while the rod had undoubtedly stretched as much as assumed the surrounding concrete had not, the end sections slipping back and relieving the concrete. In other words, there was a slip between the rod and the concrete. If the rod he used had been a rod of mechanical bond, giving a good positive grip for every inch of its strength, he would not have had this slip between the rod and the concrete.

The distance between cracks on the bottom of a reinforced concrete beam subject to uniform bending moment, may be discussed as follows:

Let d=spacing of bars in inches.
e=distance from center of bar to surface in inches.
ft=tensile strength of the concrete in pounds per square inch.
s=bonding value of bar in pounds per square inch of surface.
l=spacing of cracks in inches.

The cracks will come at such distance apart that the bond of the bar for the distance equals the tensile strength of the concrete immediately around the bar, having in this respect a close analogy to the distance apart of the shrinkage cracks in a retaining wall.

Then we have for a square bar,

$$deft=4sl$$

$$\text{or } l=\frac{deft}{4s}$$

On plain bars with real smooth surface s has been found less than 100 pounds per square inch, though, as before stated, for the ordinary rolling mill surface, with careful embedment, it has a value originally of about 500 pounds per square inch. Assuming for allowance for ordinary working conditions, and for reduction due to shrinkage of bar section, an average value of 250 pounds where there is no vibration of consequence, and where the concrete is not wet, as it would generally be in open air work, we have,

$$l=\frac{deft}{1000}$$

For a mechanical bond bar, such as the corrugated bar, for example, this value will be in the neighborhood of 750 pounds per square inch, a value also which will be practically permanent, and for this,

$$l=\frac{deft}{3000}$$

That is to say, the latter type would give cracks of only one-third the size that would be the case in the beam reinforced with plain bars, even under the best average conditions. In the case of open-air structures, subject to vibration for some years, the disproportion might be very much greater than this.

The speaker has often been asked the question, Why is it necessary to use bars of mechanical bond, when abroad, where their experience is much greater than ours, they use only plain material? The question is a very proper one, and requires an explanation. As before stated, it is only in beam work that the necessity for absolute bond between the concrete and the metal exists, and in this line of work the beginning was made in this country in 1882. These structures were intended for floors, and to carry people and loads of different kinds, and not vases, flower pots, etc., of which the foreign work up to that time mainly consisted, all of which was reinforced with plain material. For floors and beam work in general plain bars did not seem a rational material to use, just as a common sense proposition; and the speaker doubts very much whether, if the construction of such work had been presented first abroad, the foreign engineers would have considered the use of plain bars, either. The natural development would have been to have used a form of mechanical bond first, and later, if investigations showed it feasible, come to the simpler and cheaper form of plain material.

A year ago last May the Prussian government specifications on reinforced concrete were issued, and they cut down the safe allowable working stress in adhesion to about 30 pounds per square inch, recommending at the same time mechanical bond whenever possible. The above restriction on the working stress in adhesion made it very expensive, and in many cases impossible to use plain material, so that the recommendation in favor of mechanical bond was scarcely necessary. In France, too, much greater care is now taken, the bars being bent up and down and around about in the effort to obtain a better anchorage, as well as to provide for shearing stresses.

In specifying bars for reinforcement, there are a few fundamental principles that should be observed. In the matter of elastic limit, the general proposition is that the elastic limit should be as high as is consistent with the ductility required by the case in hand, up to say, 60,000 pounds per square inch. There is no object in having a higher elastic limit than this unless the modulus, too, could be raised, which is, at the present time, not feasible. Preference should be given to more bars of small section, rather than to few bars of large section, as it is desirable to have the metal well distributed through the stretching concrete area. The bars should not be painted. A slight film of rust is no injury at all, and will totally disappear after embedment. But if the bars have been exposed long enough for scale to form, this must be removed before use.

In designing, the factor of safety should, generally speaking, be four at least, certainly never less than three, which is based upon the elastic limit. That is to say, the working stress for the actual loads should be only one-fourth of the elastic limit. Many of the municipal building laws are seriously in error in that particular. This will require about three-quarters of 1 per cent. reinforcement for material having an elastic limit of 60,000 pounds per square inch and 1 3-10 for metal having an elastic limit of from 30,000 to 35,000 pounds per square inch. These are the percentages required to develop the full strength of the section in bending. Short beams, having a ratio of height to span of more than one-twelfth, will have to have some of the bars turned up at the ends, where they are not required for moment, to take care of the shear. This bending is readily done on the job cold, unless the bars are exceptionally heavy in section.

Cost of Laying Concrete Blocks

THE cost of laying concrete blocks, especially of the two piece system in this city, is a mooted point. The work is claimed by the Masons' Union and also the Brick Layers' Union, while, in fact, it is not the work of either, but should be of a separate and distinct class of men. The lowest bid obtained during the last week was 14 cents per square superficial foot, and bids have been made as high as 60 cents per superficial foot, which would be equivalent to about $30 per thousand for brick in the wall.

In this respect, replies to letters to various points showing prices paid for laying concrete blocks, two piece system is pertinent.

The Paragon Plaster Co., of Syracuse, N. Y., writes as follows:

"Replying to your inquiry of the 24th, we have nothing to do with the price of laying blocks; our business is manufacturing, and we are also material men. We, however, are not entirely ignorant of what is being done, and we know on large work that a contractor who is up in his business has been able with expert men to lay what would be equivalent to 4,000 brick per man in a day and he was running a 17-inch two-piece concrete block wall. This is certainly three times what a man would lay if they were running brick work, and we consider the 12x24 block for 17-inch wall is the most difficult block we have to handle. From information I have picked up from mason contractors, we believe that 7 to 7½c per block, mortar included, is a fair price."

The Cuyahoga Concrete Stone Co., Cleveland, O., write as follows:

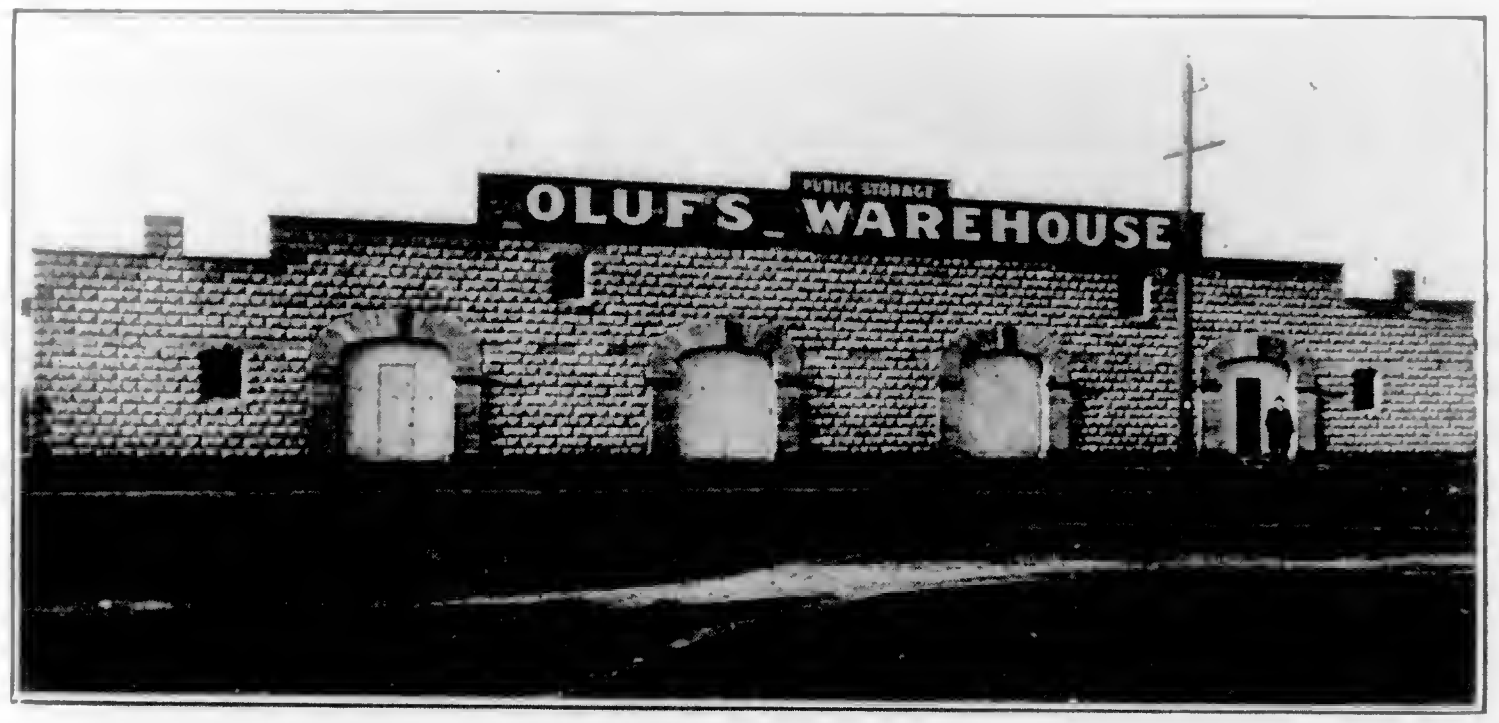
"In reply to your favor of the 24th inst., would say that we are paying contractors 5 cents a cubic foot to lay up blocks. They consider this price sufficient to give them a fair profit on the work."

Will J. Scout, Agent American Hydraulic Stone Co., writing from Chicago, January 25th, says:

"In this city contracts have been taken for 5 cents per block for laying them in the wall. Cleveland plant has contracted on different buildings for the complete erection of the building for 5 cents. We have seen the blocks laid in the walls by masons that were paid 60 cents per hour, each mason having a helper at a cost for labor of less than 3 cents per block. To this must be added the cost of helper for putting the blocks on the scaffold. This is a very reasonable price for laying these blocks in the wall, and the contractor that takes the contract at that figure and works can make a fair margin of profit."

J. A. Fergison, President of the American Hydraulic Stone Co., writes under date of Denver, Colo., January 22d:

"Replying to your esteemed favor of the 19th, a fair average price throughout the country for laying blocks, including mortar, is from 6 to 7 cents per 12x24 block."—Exchange.



Warehouse of Concrete Building Blocks Built by Valley Artificial Stone Works, Fresno C-377

Terra Cotta and Brick

*Brick Making on the Pacific Coast

By JOSEPH SIMONS

BRICK making on the Pacific Coast dates back to a very early period, and is, no doubt, as old as in any section of our country.

The old ruins in parts of our State, where a form of civilization once existed previous to the arrival of the white man, have their remnants of pottery and brick. Specimens of the pottery are similar to those found in old Mexico. The brick are of the unburned or adobe kind. Since then the clay interests of the Coast have developed, and we at the present time have every class of machinery, every kind of kiln and most every contrivance that is known to the clay-working industry in operation in our State.

Our clays are numerous and composed of various ingredients, a large per cent having derived their source from the disintegration of our mountains and hills, where, through ages of time, they have disintegrated and waters have washed them and deposited them in their present beds. The clays from this source, owing to a large per cent of oxide of iron, burn red. We also have deposits of clay burning white and all intermediate colors. When the same has been carefully selected it makes an excellent brick superior in many respects to the brick made in Eastern countries. Paving brick are now being made by our friend, Mr. Frost, which are excelled by none. Of late the attention of the clay workers is being directed to terra cotta and building tiles.

We also have with us the promoter, who derives his livelihood from the rake-off he gets from the manufacturer of machinery. He makes brick with this or that process, sets them, burns them and delivers them for less than a dollar a thousand, but it is all on paper.

Our country, like others, is strewn with mistakes and wrecks; people imagining that all they need is a machine, power to run it, an engineer at the throttle, some one to stand around and look wise and brick are made and burned without any skill whatsoever; and many are the sad stories we listen to from such ill-advised people.

But casting aside our troubles, looking on the bright side, we find in California many very prosperous brickmakers. We have many up-to-date and well-equipped yards. We see the gleam from many an eye that denotes prosperity.

Taking up our Bible and reading of the trials and tribulations of the ancients, we find that the children of Israel also had troubles, and one of them was owing to the making of brick. They were compelled to make brick without straw, meaning, as I would interpret it, a burned brick. To make the brick with straw, all that was necessary was to chop up the straw, mix it with clay and sun dry it. To make brick without straw, they were compelled to rustle the wood—

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* Extracts from Letter read at Brickmakers' Convention, February, '06.

no doubt from some far mountain—and this made additional labor, and they being no different from our brickmakers of today went on a strike, and rather than to make burned brick followed Moses forty years in the wilderness. While I am interpreting the Scriptures to you I wish to say that my Biblical researches have convinced me that the feat which Sampson accomplished in breaking the great columns which wrecked that mighty building was not due to his strength, but to the fact that the columns which gave to the building its main support were erected of reinforced concrete or cement blocks, and it only needed a little shove to push them over.

The writer considers it his duty every year or so to pay a visit to Eastern cities, and has called on and personally met the representatives of many of the largest clay working industries of the East, and from them has derived much information, and he must confess Eastern troubles are our troubles, that Eastern mistakes are the same as our mistakes, and the same cry of low prices, too much competition and not enough bricklayers is re-echoed from every State in the Union.

With us the sand lime or mortar brick has come and gone, and the sparrows now make their nests in the elevator buckets and shoot the chutes on the screens, and after a loss of many thousands of dollars, the investors in such plants have learned that carbonate of lime and sand is only mortar, no matter whether it is dried quickly or slowly, and if they want their building to have an appearance of sand finish, it is cheaper to plaster it with a coat of lime mortar than to press the same into bricks and pay $6.00 a day for laying them up.

The cement block and reinforced concrete fad is now having its rage. In dozens of back yards and on back streets can be seen little hollow block plants, the poor workman, laboring with might and main to tamp sufficiently hard his one to eight mixture so that it will withstand the slight test imposed upon it.

At the present time an assumingly new class of construction is being revised. I have in my hand a four-column newspaper article written by one of our leading promoters of plaster of Paris and twisted bars, saying that he has lately discovered that the pyramids of Egypt were built of concrete; and the dome of the Pantheon in Rome, one hundred and forty feet in diameter, was constructed of the same material: that the ancient Greeks and Romans used it exclusively, inferring that the civilized world was in darkness till he received his inspiration.

But we, as manufacturers of burned clay products, are abiding our time believing that the great builders of the past, who used our material in the structures which still remain to tell the tale, were not fools, and when twitted by our reinforced friends that our business will soon be ruined, we tell them that it is unnecessary to have any walls or floors at all to a building; that all you need to do is to think you have a building and you have one—suggesting Christian or Mental Science for the erection of structures.

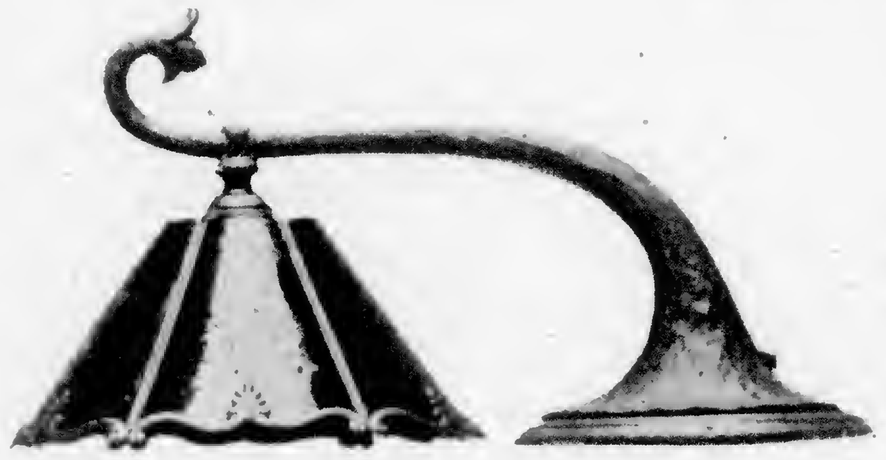
But it is an ill wind that blows no good. We have recently formed, in the City of Los Angeles, an organization of all the burned clay interests, having about four thousand interested parties connected; elected officers and are pursuing a campaign of education on such lines as will increase the use of our product, and must say that within the few weeks that our machinery has been in operation we have accomplished marvels. We find that the manufacturers of all other products except our own have agents in the field, are writing articles for papers and using every means to educate the public to use their class of material, while we, as brick men, were sleeping; but we have been aroused; we have buckled on our armor; we have sharpened our swords, and we see victory ahead.

Now a word of suggestion to the brickmakers throughout the United States. Form an organization, employ some good writers, patronize the journals that are distributed and will be read. Educate the public the same as the cement men are trying to educate them, the same as the iron men. Do this without delay, and the star of success will reappear.

Heating, Lighting and Electrical Work

Lighting Fixtures

By JOHN C. ENGLISH



THE mission of lighting fixtures is two fold, to *illuminate*, and to *decorate*, the latter being by no means of minor importance." The first portion of this statement is a self-evident truth requiring no demonstration as the very fact of their being demonstrates their use. The latter portion, however, has been greatly neglected in residence lighting, especially where the occupant has not felt able to expend sufficient money on his interior decorations and furnishings so as to carry out a well-defined scheme, or better still treat the various rooms in distinct architectural periods. In either case the lighting fixtures should be given no small amount of consideration. This does not mean that they should be the most conspicuous feature in the room and this should be carefully guarded against, as at night when fulfilling their office as lighting instruments there is danger of making them too important looking to the disparagement of the balance of the room but the ideal condition is obtained by a room being illuminated so that you feel plentifully supplied with light, but the source of it not calling for special notice, in other words, when furniture decorations and lighting fixtures are all parts of the harmonious whole.

Let us consider for a moment the lighting of a living room of generous proportions such as some of our local architects are designing for the first floor of our simpler homes or the principal assembly room of the family on the second floor of more spacious residences. The woodwork generally of redwood with a simple wainscoting 4 or 5 feet high, ceiling height about 9 feet 6 inches with beam construction. The mantel generally of clinker brick very simple in detail, walls lined with bookcases here and there to break the monotony of plain surfaces as well as to have the favorite book close to hand. Ceiling cream, walls any plain color, often brown or green.

In lighting any living room, two general principals should be considered. *First,* General lighting: *Second,* Special lighting. In the room above referred to the general illumination could be handled by a ceiling fixture operated by a switch placed conveniently near the entrance door, and in large rooms it is advisable to wire this fixture in two circuits so as to turn on all the lights or a portion of them, the object being to have well in hand the amount of general illumination required. When this is done it is well to select a design having say 5 lights, 4 arms and one light hanging from the center body so as to use the lower light only without the fact that the other 4 lights are out, being very conspicuous (see design.) This ceiling fixture should give all the general illumination necessary and it is one of the instances where low candlepower lights can be used to advantage. For instance, 5-8 c. p. lamps would give a beautiful effect and burn no more current than 2-½ 16 c. p. lamps. Mica or art glass can be beautifully employed here especially, using lanterns with open or white mica bottoms as the art glass can be handled to make a harmonious contrast with the ceiling and beams, and the lanterns being open at the bottom, you sacrifice nothing from a practical standpoint.

The special lighting can be subdivided into *first*, reading lights; *second*, bookcase lights; *third*, mantel standards; *fourth*, brackets. The reading lamp should be placed on the principal table and should receive its current from a floor plug directly underneath, and in wiring, when the table is not definitely placed, it is advisable to provide two or three outlets in various portions of the room. Bookcase lights are very useful and they obviate the necessity of turning on all the lights in the room to read the title of a book thereby disturbing all the other occupants of the room. The ideal lamp is not dissimilar in form to the conventional roll-top desk portable where the light is on a level with the bookcase especially as it will not interfere with the opening or closing of the doors of the bookcase (see design). Here also, a lantern or an open shade supplied with a pull-socket will fit in admirably. Mantel standards should, if possible, express the individuality of the occupant, old candlesticks made over being much more interesting than those made to match the balance of the lighting scheme.

Brackets can be placed here and there, not necessarily in pairs and should be preferably 2 lights and in this way offer a splendid opportunity for the introduction of emergency gas, or better still, if emergency gas is necessary, place a bracket gas only, near the center of the room and with the use of the "Bunsen Socket Burner" it will look exactly like the electric brackets and when lighted give an efficiency equal to ten 16-c. p. lamps. This efficacy would be greatly appreciated in such emergencies as the recent destruction of the local electrical company's power house, where the current was withheld for two or three days.

In general, the subject of lighting fixtures is too often put off until the eleventh hour, and contracts let on a basis of purely commercial commodity, while if considered at least before the house is wired many valuable suggestions could be offered which would be of material advantage, from an artistic, practical, and economical standpoint.

* * *

Architectural League of America

The Executive Board of the Architectural League of America, with headquarters in the Board of Education Building, St. Louis, has been filled by the election of the following: President, Ernest J. Russell; Vice-President, Frederick M. Mann; Corresponding Secretary, Wm. B. Ittner; Recording Secretary, Ernest Helfensteller, Jr.; Treasurer, John C. Stephens; Samuel L. Sherer, Jesse N. Watson. Chairmen of Committees—Publicity and Promotion, John Molitor, Philadelphia; Current Club Work, J. P. Hynes, Toronto; Education, Newton A. Wells, Urbana, Ill.; Co-operation With the Institute, Wm. B. Ittner, St. Louis; Civic Improvement, Frederick S. Lamb, New York; Foreign Scholarship, N. Max Dunning, Chicago.

Electric Wiring of Buildings

HOUSE owners and builders do not appreciate the importance of proper specifications for wiring buildings for electric light in order to make it safe and most serviceable. As a rule wires are used much too small to carry the necessary current.

This condition is brought about by the ignorance of the public in matters electrical and the lack of proper specifications for the electric wiring in the building specifications furnished by the architects to the contractors.

All other work is carefully covered by specifications, but the wiring is generally passed over as something quite unimportant with the mere statement of the number of lights or outlets and the locations of lights to be "where the gas jets are."

If left to his own devices, says an exchange, the wiring contractor will invariably use only one size of wire throughout the house, and that the smallest size allowed at all by the Board of Fire Underwriters, No. 14 wire.

He will almost invariably connect all of the wires together without any branch cut outs or fuses and depend upon only the main fuse at the point of entrance to blow in case of trouble with the wiring. Wires should be proportioned to the number of lights which they are to carry; the same as water pipes or gas pipes; consequently the main wires should be larger than the branch wires leading to the fixtures.

Wherever a small wire is to connect to a larger wire there must be a fuse or "cut out."

It is more convenient, safer and far more sightly to arrange the wiring so that all "cut outs" and fuses may be installed in a central cabinet box or panel in the wall.

In an ordinary size residence, one of these cut out cabinets is sufficient for the whole house, but in the larger residences it is best to arrange the wiring for a cabinet on each floor.

Where one is used it should be centrally located, preferably in a hall. The three main wires lead to this from the main switch and meter, and the lights in the different rooms should be distributed on several branch circuits leading out from the cabinet and each protected by a fuse in the cabinet.

The rule is that each branch shall not carry current to exceed 660 watts, equivalent to about twelve 16-candle-power lights to a circuit.

The advantage of this plan of wiring is that being cut up into small independent sections, with a few lights on each, small size wires can be used, and even if the contractor uses the smallest size allowed they will still be of sufficient capacity for the number of lights on them, provided distances are not too great.

Other advantages are:

1. Only a few lights extinguished by the blowing of a branch fuse, instead of all lights out by the blowing of the main fuse, usually located in the cellar or attic.

2. No danger of sockets burning out with explosive noises and sparks, and in case of wires becoming crossed or grounded onto the gas pipe at the ceiling the small fuse will be blown quietly before any damage is done to the ceiling.

3. Cut outs being necessary, it is better and more convenient to have them located in one place easily accessible for inspection and replacing of burned out fuses, instead of having a man bring in a tall stepladder to reach a cut out located on the wall or ceiling, the decorations of which he may

injure. The following simple specifications will cover most wiring and are applicable to large and small buildings for concealed wiring:

1. Best approved double rubber covered thinned copper wire must be used.
2. All joints in wires must be soldered, and after inspection must be taped.
3. Wiring must be on three-wire system from point of entrance to the one or more "cut out" cabinets or panels.
4. Cut out cabinets must be arranged for three-wire supply and two-wire branch circuits.
5. Cut outs must have either Edison screw plugs or inclosed cartridge type fuses.
6. Loops must be left for meter connection and a smooth board installed upon which meter will be mounted, at a height not exceeding 7 feet above the floor.
7. A three-pole switch and cut out of ample carrying capacity must be installed at the point of entrance to the building and on the inside.
8. Wires from entrance to cut out cabinet must be of such size as to not cause more than 1 per cent. drop or loss in volts when all lights are lighted.
9. Branch wires from cabinets to outlets must be of such size as not to have more than 1 per cent. drop or loss in volts when all lights are lighted. Nor a maximum of 12 16-candle-power lights. No. 14 wire can be used for branch circuits not exceeding 31 feet in length one way. If distance is greater No. 12 must be used.
10. All overhead lights to be turned on and off by switches on walls near the doors of each room.
11. Flush push button switches in steel cases preferred.
12. Wires to be kept free from crosses, grounds and open circuits until inspected and covered in, and to be guaranteed and kept free from all defects for one year.
13. Wiring must be done in a workmanlike manner and in accordance with rules of National Board of Fire Underwriters.
14. Contract to include all labor and material, wire, main line switch and cut outs, cut out cabinets and cut outs, and any and all other switches and necessary fittings to make the wiring complete from point of entrance to each outlet, but not to include any chandliers, brackets, fixtures or portable cords.

* * *

A Building Entirely Without Wood

THERE is at present nearing completion in the city of Bridgeport, Conn., a building which is unique in the fact that it contains no wood whatever and which will be when finished as nearly fireproof as it is possible to make it. It is constructed on the cantilever plan, and is supported by foundations of great strength. The walls are of concrete, the floors are of a composition which is fireproof, and the doors, window sills and frames are of metal. The staircases are of the winding type and are made of concrete. The structure is attracting much attention on the part of engineers and insurance men by reason of the fact that the building will be absolutely devoid of wood and that every feature of construction has proved its value, there being no methods employed that are experimental.

Amount of Air Required for Ventilation

By F. H. BRYANT

UNDER the general conditions of outdoor air, namely 70 degrees temperature and 70 per cent, of complete saturation, an average adult man, when sitting at rest as in an audience, makes 16 respirations per minute of 30 cubic inches each, or 480 cubic inches per minute. Under the previously assumed conditions of 70 degrees temperature and 70 per cent humidity, the air thus inhaled will consist of about 1-5 oxygen and 4-5 nitrogen, together with about 1 7-10 per cent. aqueous vapor and 4-100 of a per cent carbonic acid. By the process of respiration the air will, when exhaled, be found to have lost about 1-5 of its oxygen by the formation of carbonic acid, which will have increased about 1-100 fold, thus forming about 4 per cent. while the water vapor will form about 5 per cent. of the volume. In addition, the inhaled air will have been warmed from 70 to 90 degrees, and, notwithstanding the increased proportion of carbonic acid—which is about one and one half times heavier than air—will, owing to the increase of temperature and the levity of the water vapor, be about 3 per cent. lighter than when inhaled. Thus it will be seen that this vitiated air will not fall to the ground, as has often been presumed, but will naturally rise above the level of the breathing line, and the carbonic acid will immediately diffuse itself into the surrounding air. In addition to the carbonic acid exhaled in the process of respiration, a small amount is given off by the skin. Furthermore, 1½ to 2½ pounds of water are evaporated daily from the surface of the skin of a person in still life. If the air supply at 70 degrees is assumed to have a humidity of 70 per cent and to be saturated when it leaves the body at a higher temperature, then at least 4 cubic feet of air per minute will be required to carry away this vapor.

Taking into consideration these various factors, it becomes evident that at least 4½ cubic feet of fresh air will be required per minute for respiration and for the absorption of moisture and dilution of carbonic acid gas from the skin. This, however, is only on the assumption that any given quantity of air having fulfilled its office, is immediately removed without contamination of the surrounding atmosphere; but this condition is impossible, for the spent air from the lungs, containing about 400 parts of carbonic acid gas in 10,000, is immediately diffused in the atmosphere. The carbonic acid does not fall to the floor as a separate gas, but is intimately mixed with the air and equally distributed throughout the apartment.

It must then be evident that ventilation is in effect but a process of dilution and that when the vitiation of the air discharged from the lungs is known and the degree of vitiation to be maintained in the apartments is decided, the necessary constant supply of fresh air to maintain the standard may be very easily determined. For the purpose of calculation, 0.6 cubic feet per hour is accepted as the average production of carbonic acid by an adult at rest and the proportion of this gas in the external air is four parts in 10,000. If, therefore, the degree of vitiation of the occupied room be maintained at, say, 6 parts in 10,000, there will be permissible an increment of only two parts in 10,000 above that of the normal atmosphere, or 2-10,000—.0002 of a cubic foot of carbonic acid in each cubic foot of air. The 0.6 cubic foot of carbonic acid produced per hour by a single individual will, therefore, require for its dilution to this degree 0.6 divided by .0002 or 3,000 cubic feet of air per hour. Upon this basis the following table has been calculated:

Cubic feet of Air Containing 4 Parts of Carbonic Acid in 10,000 Supplied per Person...	Per Hour.	6000	4000	3000	2400	2000	1800	1714	1500	1200	1000	525	375	231
	Per Min.	100	66.6	50	40	33.3	30	28.6	25	20	16.6	9.1	6.2	3.8
Degree of Vitiation of the Air in the Room...	Parts of Carbonic Acid in 10,000.	5	5.5	6	6.5	7	7.33	7.5	8	9	10	15	20	30

The figures indicate absolute relations under the stated conditions, and are generally applicable to the ventilation of schools, churches, halls of audience and the like, where the occupants are reasonably healthy and remain at rest. But the absolute air volume to be supplied cannot be specified with certainty in advance, without a thorough knowledge of all the conditions and modifying circumstances, in fact, the climate, the construction of the building, the size of the rooms, the number of occupants, their healthfulness and their activity, together with the time during which the rooms are occupied, all have their direct influences. Under all these considerations, it is readily seen that no standard allowance can be made to suit all circumstances, and results will be satisfactory only in so far as the designer understandingly, with the knowledge of the various requirements as they have here been given, makes such allowance. The following schedule of air supply, in cubic feet per hour, as proposed by Dr. Billings is here presented as showing relatively the volumes recommended by him in different classes of buildings:

	CUBIC FEET PER HOUR
Hospitals	3,600 per bed
Legislature Assembly Halls	3,600 per seat
Barracks, Bedrooms and Workshops	3,000 per person
Schools and Churches	2,400 per person
Theatres and Ordinary Halls of Auditoriums	2,000 per seat
Office Rooms	1,800 per person
Dining Rooms	1,800 per person

These figures are for buildings in which there is no special contamination of the atmosphere beyond that which their use would indicate. Where smoke, dust, noxious gases or infectious germs are produced, and above all where the illumination is furnished by candles, lamps, or gas, additional provision of air supply must be made. Thus a single 4½ gas burner demands 45 cubic feet of air per minute and the resulting carbonic acid gas, unless sufficiently diluted, or immediately removed, will seriously vitiate the air. The introduction of modern methods of incandescent electric lighting has done much to simplify and facilitate the solution of problems in heating and ventilation.

The air volumes recommeded for ventilation by various investigators of the past century show a constant increase in their quantity as the years progress. As good ventilation is only a relative term, depending largely on one's experience and the possibility of improvement, it must be evident that perfect ventilation in the broadest sense can only be secured in the open air. It is, therefore, the province of ventilation to approach as near this perfection as means and expediency will permit.

The crystallization of public opinion into statute laws, looking to adequate methods of ventilation for school, theatre, church and factory, has resulted in the establishment of a basis or limit which will meet the approval of those upon whom is placed the responsibility of enforcing these laws. Under the law as

first passed in Massachusetts, the attempt was made to secure 50 cubic feet per head per minute, but it was soon discovered that such provision would necessitate the remodeling of practically every building in the State. Therefore, financial outweighed all other influences, and the limit was dropped to 30 cubic feet, a figure adopted not because of hygienic deductions but because it appeared upon investigation to be the practical limit attained by existing methods in the commonwealth.

This basis of 30 cubic feet has been very generally adopted throughout the country, and is to-day recognized as the minimum volume to be provided in any system of ventilation worthy of the name. As the benefits of good ventilation are still further recognized and the ability of the fan to provide practically unlimited volumes of air is better appreciated, this limit will gradually rise until we may one day witness the compulsory provision of air for the purpose of ventilation in such volumes as to render further improvement of no practical benefit.

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Uncle Sam an Art Patron

As a patron of art Uncle Sam is fast assuming a place comparable with that of the Church of Rome subsequent to the Dark Ages, especially as it relates to architecture. This tendency to indicate the dignity of the nation in the designs of Federal buildings is more noticeable in recent years than formerly. There is apparent the sedateness of age, the stability of power, the consciousness of self-reliance reflected in the newer edifices erected for the purpose of carrying on the government of these United States. Leaving out the Capitol in Washington, the buildings erected in the early period of the government were nondescript, inasmuch that they followed no consistent design, and it was only as architectural tastes developed in this country that any attempt was made to correct the faults which made glaringly conspicuous the early public buildings. With the creation of the office of the government supervising architect there began an obvious improvement in the style and design of public buildings. There were a few notable exceptions, both in the National Capital and in other cities, which were and still are examples of a purity of style that made them conspicuous. The present supervising architect, Mr. James Knox Taylor, has held persistently and consistently to an ideal based on what is opposite in the nature of public buildings. He has been guided in his work of selection by advice or suggestion of the ablest architects in the country, with the result that the newer buildings symbolize the greatness, the solidity and the dignity of the government and nation which own them. In this the Renaissance and the modernized Grecian styles are those given the preference. Notable examples of the former are shown in the new buildings, as the Naval Academy, Annapolis, which are admittedly the finest aggregation of buildings in the world, devoted to this purpose. One might travel Europe from one end to the other, visit the great public buildings in the Old World capitals without finding anything to approach the impressive grandeur and beauty of the Congressional Library in Washington. The new Custom House in New York is another notable example of the government's liberal intention to foster the best in art and architecture. The new Custom House in Baltimore, while smaller in magnitude and less elaborate in ornamental detail, is, nevertheless, an illustration of the same high ideal which clearly dominates the planning of Federal buildings. America is yet too young to point with pride to historic ruins, but in the course of ages, should these erected today become roofless and tenantless, the spectator of their crumbling walls will feel that they represented something to be admired and venerated.—Architects and Builders Journal.

Lessons of the First Heavy Storms

By HARRY LARKIN

VISITORS from the East and from Europe laugh at our wood construction, but it suits us, befits our salubrious climate and our earthquakes, and our migratory natures. European mechanics laugh at the way we build locomotives and point with pride to their own copper fire-boxes and rigid frames and general permanent construction. Americans believe in more flexible and cheaper construction both for locomotives and buildings, casting them aside when out of date and adopting improvements as they appear. This principle has been the cause of our remarkable success; we set the pace and the European follows as best he can.

We admit certain little weaknesses in wood construction which a little care and attention will overcome in the building. Siding of any character will admit water during a heavy storm in spite of the skill used in putting it up. Waterproof building paper is the means used to prevent its entering the building and it is the character of this material and the care used in applying it that will make a wall tight. Building paper that tears in our winds is like money thrown away when used. A few dollars more spent in getting good paper will save the carpenter many trips to remedy leaks, after the first heavy storm.

There is no economy in the stiff, brittle papers on the market, although they are water-proof. A soft, pliable material more in the nature of a saturated felt will stand the wind, is water-proof, easier to handle and will not crinkle up like the stiff, high calendered papers do. There are several such sheating papers on the market, among others the "P & B," "W & P" and Starco asphalt saturated felts, the Neponset building paper, etc., and recently an asbestos saturated felt has been put on this market by the H. W. Johns-Manville Company which not only has all the desired qualifications of a good water-proof sheathing, but also is fire-proof, an item that should command its adoption regardless of cost.

In erecting a building where the roof flashes up in a rustic wall a leak is bound to show unless the flashings are "panned in." This will not add to the cost of construction but will save the carpenter, the roofer and the owner a lot of worry.

While speaking of roofs let us call attention to the importance of examining the roof, whatever its character, before the first heavy storms. In localities where high winds prevail during the summer, one would be surprised to see the accumulation of dust and rubbish that will gather on a roof. The dread people have that this rubbish may stop up the sewer, leads them to put screens at the outlets or in the leader-heads. If the first rains are moderate, no damage will be done, but if a heavy down-pour comes, water will bank up over the flashings and ruin the ceilings. The felt and gravel roofs now so generally used have caused owners to become careless in their attentions to that part of the building, as a result the tin on the fire-walls and over the cornices receive no attention until they leak and then they are beyond repair.

A GOOD WOOD BLOCK PAVEMENT.

We (Larkin & Flaherty) had a force of our mechanics at work from 6 P. M. February 21st till 5 A. M. February 23d taking up and re-laying a wood block pavement in Dunham, Carrigan & Hayden Co.'s steel warehouse on Main street, that was laid by this firm when the building was built over 20 years ago.

The building is of brick with wood joist. The sheathing upon which the pavement was laid had rotted so that it had to be replaced. The blocks taken up were in good condition and showed no evidence of the heavy traffic they had carried for these many years. Trucks loaded with iron up to 6 and 8 tons go over the pavement daily, the wheels tracking in a manner that no other character of pavement could stand. The surface permits the heavy loads being started without the horses slipping and does not allow the wheels to sink into the pavement while standing.

A wood block pavement, as laid by us, costs no more than any other character of material and the service this pavement has given demonstrates it to be the most economical pavement for such uses. Unfortunately through the use of asphaltum not adapted to paving, wood block pavements have in certain instances been failures, but where a conservative firm does the work, you may depend upon getting value for your money.

* * *

Houses of all Glass

MENTION has been made in these columns heretofore of the proposed glass houses in Des Moines, Iowa. The Des Moines Savings Bank, as well as the Methodist Church in that city, are to be built with glass walls, and a 26-story office building of glass has also been proposed. In structures built of this material, the ventilating, as well as the lighting, heating and cleanliness, excel, it is claimed, anything of this character ever before attempted.

These buildings were designed by C. E. Eastman, a well-known architect of Des Moines, whose idea of glass-wall construction includes the use of milk-white, opalescent wire glass one-quarter inch thick, securely fixed in two steel vertical divisions, which are parallel and laced together for the purpose of stiffening. These divisions are supported at the floors by brackets riveted to the steel channels of the floor construction.

The wall thus consists of two glazed screens separated by a foot of dead air space, which affords insulation against heat, cold or sound to as great an extent as would a solid brick wall of the same thickness. The double vertical divisions are spaced about four feet apart. The two glass screens are translucent to any degree desired, so that, in cases where windows are not necessary for reviewing the landscape, they may be dispensed with altogether, provided the building would warrant the installation of mechanical ventilation and heating. The exterior effect is that of a marble wall with or without windows. If windows are desired, it is not necessary to have the regulation two-sash type: but, as the pockets are already provided, single-sash metal windows can be used, lifting up into a metal guide, into the space of the wall. Onyx and many other kinds of stone can be imitated with the glass.

The construction provides approximately an inch for movement at the edges of the glass sheets, which are about 4 feet by 10 feet in size. This will cause any uneven settlement of the building to be adjusted by itself in the framework and glass, without becoming evident to the eye.

A glass wall is of very light weight compared with one of masonry. Fire damage would be local and easily repaired, experience showing that the wire glass prevents the spread of fire, though the glass itself is shattered. With this construction, however, replacing material is easier than would be the reglazing of a window of the same size. The expense of a glass wall is some less than that of a brick wall, and lacks all the disadvantages of the latter, being much lighter in weight, allowing a soft light to penetrate through, and having a surface which is self-cleaning in wet weather, and which, in the case of tall buildings in cities, reflects light to the lower portions at the sidewalk.

The fact that no windows are necessarily required is one of the chief advantages claimed for this method of the method of construction, since the entrance of dust, smoke, insects, etc., through such openings, is rendered impossible. When an outlook is desired, however, plate-glass windows can be inserted.—Paint, Oil and Drug Review.

Notes from the San Francisco Architectural Club.

On Wednesday evening, February 7th, Mr. C. F. Archer addressed the San Francisco Architectural Club on the subject: "Fakes Perpetuated by Structural Steel Manufacturers."

Mr. Archer's remarks were quite pertinent, and he commanded the attention of every one present from the time he commenced until the end.

His statements concerning the steel work in a number of San Francisco buildings were revelations to his audience.

This was the first of a series of talks to be given on the first Wednesday of every month by the different members of the club. The executive officers of the club have elected this to be the best scheme for holding the attendance of the members.

Heretofore the first Wednesday was set aside for the business meeting, but business matters will take up time and the young minds do not care to spend their time on such weighty affairs.

Now the business is all transacted by the executive committee on the last Thursday of each month.

The secretary makes a report of all business transacted at these meetings and reads it the following Wednesday evening before the club. After this reading the lecturer of the evening begins, and he in turn is followed by games and refreshments.

* * *

The class in steel construction Monday nights continues to be one of the leading attractions at the club. The attendance averages twenty. The problems have been very interesting, and all seem hard, but the teacher's lucid explanations make them appear like kindergarten topics.

They are wrestling with trusses at present, but any new member who wishes to begin may start right in and Mr. Archer will see that he can make up the back work.

* * *

The class in pen and ink rendering is rather small at present, but those attending are doing very satisfactory work under the guidance of Mr. A. O. Johnson.

Pen and ink rendering does not seem to have the attraction that a knowledge in steel construction does to a young draughtsman.

* * *

The first competition for the European Traveling Scholarship of the Architectural League of America, under the auspices of the San Francisco Architectural Club, was held last Sunday in the clubrooms. Competitors were required to make their sketches in nine hours, the subject being a "Railway Station." Five members of the club entered and every one completed his sketch before leaving the rooms.

Mr. M. A. Schmidlin, the club's secretary, was the officer in charge.

* * *

At the convention of the Architectural League of America in New York City a number of visiting architects were interviewed by a representative of the New York Herald. August G. Headman, a member of the San Francisco Architectural Club, and who is at present studying in the University of Pennsylvania, was much impressed by the original manner in which the builders of structures in the lower part of Manhattan Island had worked out the problems which had presented themselves.

"In engineering skill, in composition and in general effect," said Mr. Headman, "the skyscrapers of New York are wonderful. The skill with which the smallest plots of ground are made to furnish so much floor space is in itself a thing to compel wonder and admiration. The conditions which are met in such construction were not dreamed of fifty years ago. The general effect is, in my opinion, somewhat overdone, especially where the French style is introduced. In time, however, I think that the architecture of New York buildings will become plainer and it will be so Americanized that the French influence will gradually disappear and styles will prevail which are more in keeping with the conditions to be met.

"There is often a tendency toward gaudiness, which I observe especially in the best hotels and other buildings which serve as places of public resort. This, however, is due to the taste of persons who wish to show their money, and the buildings are constructed with the same idea. Before long, however, I think there will be a reaction, and that a less pretentious style of architecture will prevail with the change of ideals of the people.

"There are here now many fine examples of architecture, among which might be mentioned the Stock Exchange, the New York Public Library, which is now nearing completion, and the Custom House, which is, indeed, a great work. I am inclined to think that a hundred years from now a style of architecture will have been developed which will be distinctively American.

"The buildings are not likely to be any higher unless some new elevator system is invented which will enable the elevators to be carried to greater height or there is some other method devised of reaching the upper stories. It takes about so many elevators to carry a certain number of tenants to their offices, and every building must be considered with regard not only to its floor space, but also with reference to the amount of room which will be taken up with an elevator system. When the elevators encroach upon the floor space it is not profitable to build the structure higher, and I am inclined to think that the skyscraper has reached its greatest height, although not for the reason that as an engineering problem it would not be possible to build them higher than they are at present."

* * *

Small Beginnings of Rich and Famous Americans

Cornelius Vanderbilt ferried his own boat.
John Jacob Astor sold apples in the streets.
Jay Gould was a book agent.
John D. Rockefeller worked in a machine shop.
A. T. Stewart was a school teacher.
John Wanamaker began life at $1.25 a week.
Andrew Carnegie began life at $2.50 a week.
Benjamin Franklin was a printer.
Elihu Burritt was a blacksmith.
Abraham Lincoln was a rail-splitter.
James J. Hill began as a roustabout.
William A. Clark as a young man was a miner.
Henry Villard was a reporter.
Thomas Edison began as a telegraph operator.
Thomas F. Ryan was clerk in a dry goods store.
William Lloyd Garrison was a printer's devil.
Daniel Drew began as a cattle trader.
Henry H. Rogers was a grocer's delivery boy.

Annual Banquet of the San Francisco Exchange

TWO hundred San Francisco craftsmen in the art of construction gathered 'round the festal board at the St. Francis hotel Saturday evening, February 24th, on the occasion of the annual banquet of the San Francisco Builders' Exchange. Architects, millmen, plasterers, plumbers, brickmen made up the cosmopolitan gathering, and the representatives from the organizations akin to the builders were called on during the evening to speak from their various view-points.

John D. McGilvray, the man under whose masterly guidance the hotel St. Francis was constructed, spoke on San Francisco. After reviewing his reasons for coming from the East to enter the stone-building business in this city, Mr. McGilvray said:

"I was fortunate in arriving in San Francisco in the days of her rejuvenation. That was in 1894 and just at the ending of a long period of stagnation in the building industry in this city. The Union Trust Building was the one structure of consequence being erected at that time. Now, after the lapse of twelve years, look at the San Francisco of to-day.

"And to whom is the credit for this great change to be given? I say it shall go to the architects who planned the buildings and the mechanics who carried out these plans. We cannot separate the architects from the mechanics and we do not want to. We have in San Francisco to-day a lot of men designing great things and you, the builders, are building well.

"We have good reason to work for the beautification of our city. San Francisco is the natural inlet of Asiatic commerce and this city must not follow others in building and designing, but must take her place at the head of all such enterprise. Our architects must be the men to plan the beautification of this city and we have the men here who can do it. When we plan and build, let us do so for all time. We must lay out our city and then leave it to the energy of you men here to build up and the enterprise of our own citizens to pay for such building.

"There is no city, and I say this because I have traveled about and observed, that does better building than San Francisco. The people in this city will not stand for the cheap or the shoddy, and that is a most excellent sign. In building we must be our own inspectors. Every man must answer to himself for the class of work he does and if he can honestly answer to himself he can answer to any inspector that lives.

"In closing I would remind you that Chicago taught New York how to build, and now it is up to San Franciso to teach the rest of this nation of ours how to build beautifully, substantially and honestly."

S. H. Kent, president of the Builders' Exchange, acted as toastmaster, and called on the speakers. Brief remarks were made by Thomas McKillican of Oakland, Andrew Wilkie for the millmen, President Anderson for the Builders' Association, G. A. Buell for the planing millmen, W. S. Barnes for the brickmen and President H. A. Schulze, President of the San Francisco Chapter, A. I. of A. James A. Wilson, Secretary of the Builders' Exchange, closed the banquet on behalf of his organization.

The menu for the banquet was gotten up in the form of a booklet and was illustrated with cartoons of prominent members of the exchange, and columns of jokelets entitled, "Material Sounds Heard in the Building."

It was considerably after midnight when the festivities were brought to a close with the singing of "He's a Jolly Good Fellow," in honor of S. H. Kent, the venerable and respected President of the Exchange.

A New Tax on Architects

THE City Council of Oakland has passed an ordinance which levies a tax on almost all kinds of animals, including architects.

The tax or license on a dog, which latter is allowed to run at large, is fixed at a less sum than the tax on architects, probably because it was thought that the dog is a more harmless creature than a knight of the T square. The tax on a stallion, kept for service, or a bull is about the same as that demanded from the poor dumb beast who daily bends his back over a drawing board creating frozen music and other Ruskinisms. Incidentally many commercial pursuits were also taxed, but no other profession was included.

There is some doubt as to what method will be employed to enforce payment of this charge. In the Athens of the Pacific they maintain a poundmaster who enforces the tax as far as the genus canus is concerned, but instead of gathering in the taxless dogs by a gigantic butterfly net, as is the custom in the civilized parts of the world, they use a lasso with which they strangle the vagrant cerberus into submission and cast him then into a foul enclosure from whence he is condemned to asphyxiation, if his fond owner does not sally forth to the rescue. No doubt many of the owners for whom the Oakland architects are creating bungalows and "sich like," would gladly come to the rescue before the lethal chamber stage was reached, but we fear the shock to the system caused by the rough treatment and the strangulative lasso of the license collector.

The patriarchal fathers, when interviewed, informed a committee of architects that no tax had been levied on doctors or lawyers or dentists because they were governed by a State law which regulated the practice of their profession, and seemed very much surprised to know that the architectural profession was similarly controlled, but, like the Shah of Persia, they could not revoke what they had decreed, and the law, they said, must stand. They, however, gave the committee to understand that the carpenter-architect, to whom the drawing of plans was incidental to his business, and to whom it was not an exclusive method of earning a livelihood, would not be considered as taxable, so that the jerry-builder can roam at large without a leather collar with a brass tag thereon.

Another committee of child-like and innocent knights of the pencil salaamed before the City Attorney to get his opinion of the legality of the ordinance, but he was busy trying to find legal reasons why the citizens in the various wards couldn't vote on local option, and as the architect doesn't have a lot of stew-bums and hangers-on ready to vote as he dictates, he was given the overlook, while the saloon-keepers got the attorney's legal decision and the architects, like the fellaheen of Egypt, await with fear and trembling the dreaded coming of the hated tax-gatherer.

Another committee went to interview the Mayor, but the Mayor is of very ample waist proportions and the committee couldn't button-hole him, as the committee's arms were not long enough to reach over the capacious paunch of Oakland's Sancho Panzo—the committee, on account of the same plethoric stomach, was unable to get near enough to get the Mayor to hear them, and they also returned in sack-cloth and ashes from their fruitless mission.

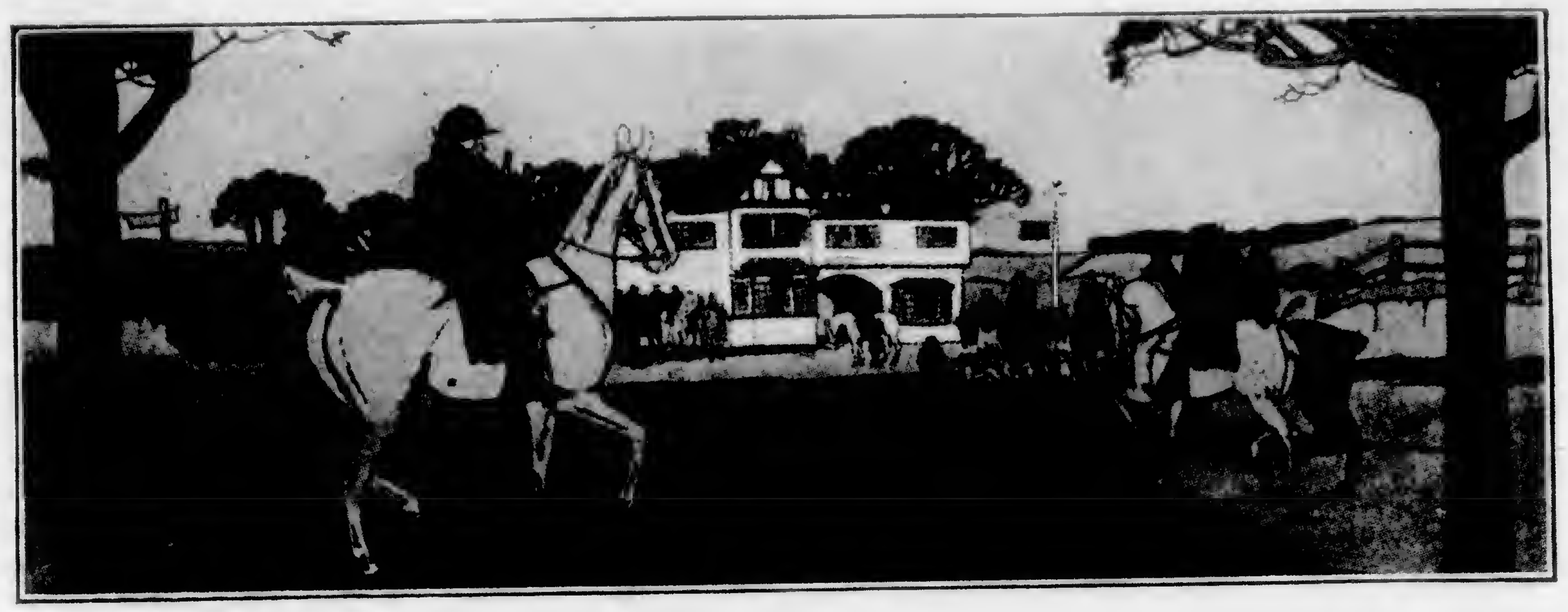
It is said that the councilmen contemplate adding an amendment to the law requiring that the architects wear a leather muzzle during the hot months, and the amendment surely ought to pass, for if they are to be taxed the same as a stray cur, then the treatment should be parallel in all ways. The village

"Dogberrys" who passed this tomfool legislation gave out as their reason the fact (?) that the city needed the money. There are not over ten practicing architects having an office in the trans-bay sleepy hollow, and a city must indeed be poor that needs (?) two hundred a year so badly that it taxes its professional men for the privilege of earning their bread and butter.

The writer would recommend to the legislative gentlemen before referred to, that if the city of Oakland, which is generally supposed to be experiencing a boom, needs money so very badly, that they, the aforesaid legislators, levy a license tax of twenty dollars a year on nurse girls, as there are a great many more of them than there are architects, and the amount of revenue raised would be greater.

We are sorry for the great (to be) terminal city of the Western Pacific, and fear that this confession of poverty will not assist in the movement to effect a consolidation of all the east bay cities into one great metropolis, for Oakland's neighbor towns must surely look with suspicion on a city that needs two hundred dollars! A. W. SMITH.

Treatment for Bedroom *L. Tozer and Son Co.* C-378



Interior Decoration Up-to-Date Furnishing

Dining-Rooms—Overdone and Underdone

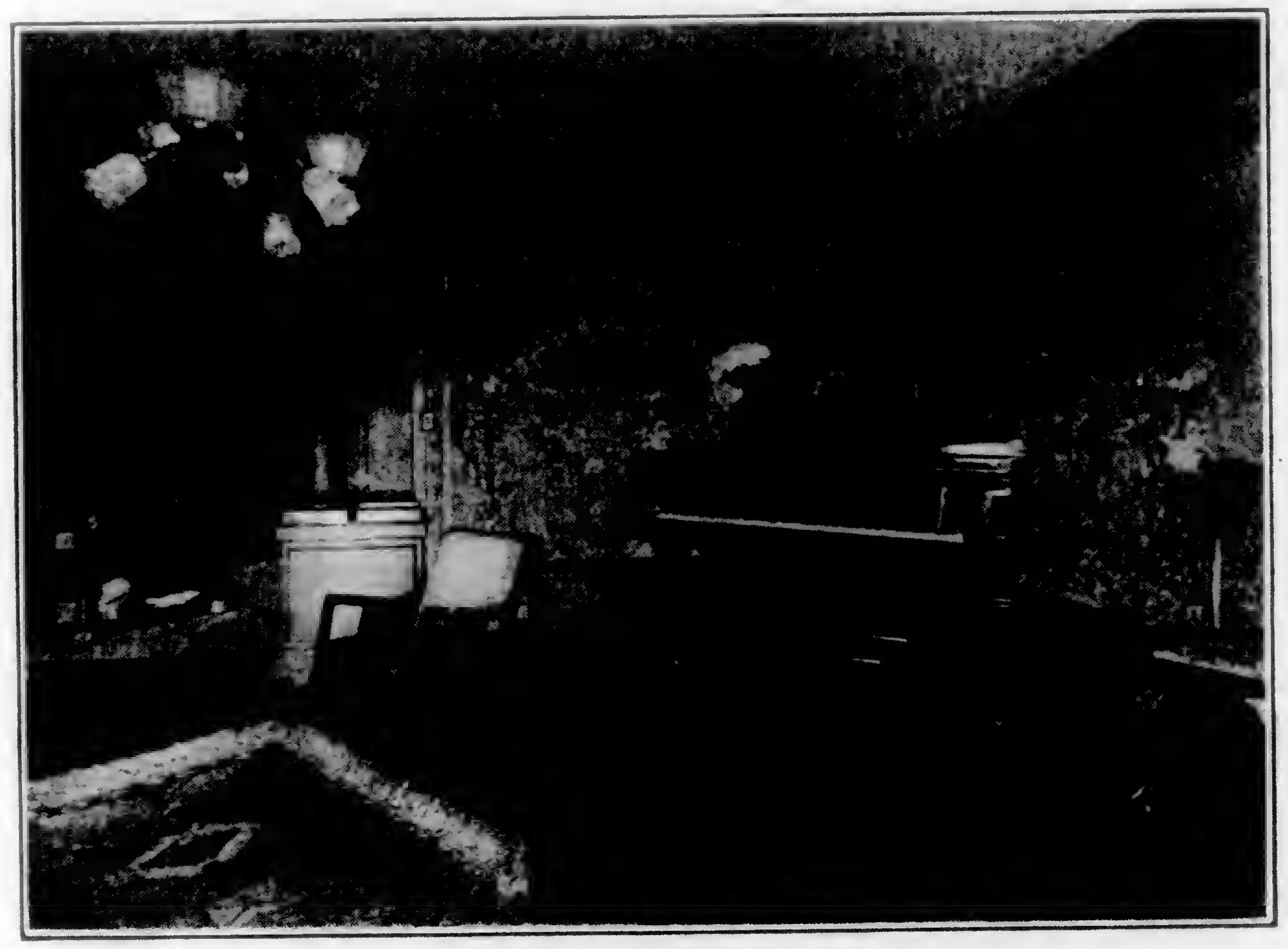
By C. WALTER TOZER

HOW often in attractive and pleasing homes do we find the dining-room the one element of discord in an otherwise harmonious and peaceful home. It has been said that "His dining-room is the touchstone of a man's refinement." This does not apply to its decoration alone, but the intimate philosophy which the architecture and decoration together express. There is an amiable quality of temperament that governs successful home decoration generally, and the dining-room in particular. Everybody wishes to express this philosophy without knowing it, perhaps without believing it,—that it is the keynote of a dining-room design. Even in dining-rooms which are distinctly banal and tawdy, we recognize what the owner wishes to express very well, only they had bad advice about it and did not express it.

Artificiality, stuffiness, tawdiness and lack of harmony was the result. The pretentious dining-room is naturally left to the decorator of experience and reputation, but every one has not the means to do this. Our article does not attempt to deal with this class of dining-rooms, but to the typical dining-room of mediocre city homes and suburban houses.

Period style of decoration for dining-rooms is all well enough when one has the money to expend in making the room correct in all its furnishings and decorations, but small means can not accomplish this except in a few simple styles, such as the Mission, Colonial, etc. Anything departing from the Anglo-Saxon dining-room is not to be recommended in America. The out-and-out American dining-room is the one that always commends our praise and the one we can at all times turn to with pleasure and gratification.

Treatment for Lower Hall by W. W. Tucker C-379



Living Room of a San Francisco Home
Wall Papers and Decorating by Llewelyn C-380

Simplicity, as a rule, can be utilized to produce a good room of any description, particularly a good dining-room. But the word "simplicity" is not always a safe word by itself for the successful decoration of a home, because there are a great many people who can not distinguish between good simplicity and that which is bad,—in fact, positively ugly.

For instance, a dining-room may be simple enough to suit any one, yet the room could not be called a pretty one. The window sills may be either unduly elevated or else unduly depressed, and the whole room devoid of features. There may be neither chimney nor fireplace; no cornice, no chair rail, no wainscot;—or, in a word, no especial character but simplicity. Thus we see that simplicity has a meaningless side which is worthless for art purposes. This same room could be made attractive by the use of a wainscot and cornice; the addition of a chimney and fireplace; and possibly the alteration of the window sills. The room would still have simplicity, but character as well.

One may be as original as they please in the making of their dining-room, but the originality must be confined within the iron-bound limits of precedent.

Freaks should be avoided, although sometimes they are in a way artistic successes. They often, however, produce a room which is not a dining-room.

On the other hand, one should not make his dining-room so strictly a dining-room as to appear a solecism were one to sit in it at other times than meal times. This is the "under-done way of it. One should have some of the living-room atmosphere about it,—some silent invitation to linger after the cloth has been removed, such a very homelike and comfortable all-around apartment, indeed, that one might wish to tarry at any time with his book or his writing materials.

Then you have your successful dining-room. Not over-done or under-done. There is now an increasing demand in California for what is called cretonne rooms. Rooms having the wall paper exactly matching the hangings have not been very plentiful on our Coast, but the demand for such is increasing very much at the present time.

What is prettier for a restful sleeping-room than a beautiful "all-over" floral pattern or a floral striped paper on the walls, with the window drapes, couch covering, and canopy bed covering all done with a cretonne just matching the wall paper?

The illustration shown represents an especially attractive room. The treatment is good for a city bedroom, where there is perhaps a scarcity of airiness as is conveyed by such a decorative scheme. It is also equally as fine on the other hand for a country house, which no doubt has the natural flower growth without.

Within the last few months a leading firm of decorators in San Francisco has been commissioned to decorate several rooms in this style, and the effects have been gratifying, both to the customer and the decorator.

Fabrics exactly matching wall papers are also found in other grades than cretonnes. There are silks, brocades, and tapestries having papers made to match them. These also work up well for sleeping-rooms and dining-rooms respectively. The papers having cretonnes to match are not necessarily expensive papers and a great many have the domestic cretonnes matching, making the cost of a cretonne room very nominal.

The papers range in price from twenty-five cents retail to a couple of dollars a roll, while the cretonnes can be had in domestic goods from twenty-five cents a yard upwards and the imported cretonnes from fifty cents up.

The coming season will no doubt see a great deal of this class of work done in both city and country homes.

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

At the last examination of the California State Board of Architecture the following were granted certificates to practice: Robert Morganried, Henry H. Hedger, of San Francisco, and Thomas Beck, of Watsonville. The next examination will be held the latter part of April, and application should be filed with the secretary by April 20th.

While in the East last month Mr. Henry A. Schulze, president of the San Francisco Chapter A. I. of A. attended the annual convention of the American Institute of Architects in Washington, D. C. Mr. Schulze was much impressed by the general prosperity of the country, but from a building standpoint California is enjoying even greater activity than some of the larger Eastern centers.

A banquet at which various questions of interest to the profession will be discussed, will be held by the San Francisco Chapter A. I. of A. the latter part of March.

A joint meeting of the Northern and Southern Districts of the State Board of Architecture will be held in Los Angeles April 10th.

The Fairmount Hotel, Reid Bros., architects, is reported to have been purchased by Herbert E. Law and his brother, Dr. Law, in exchange for the Crossley and Rialto office buildings. There is talk of enlarging the building by the addition of two stories

An interesting contest was held by the San Francisco Architectural Club the past month for a cover design for The Architect and Engineer. The first choice was awarded to Mr. T. Bearwald draughtsman in the office of Sutton & Weeks. The design appears on the cover of this issue of the magazine. Second choice went to A. O. Johnson, of Meyers & Ward's office, and the third prize was awarded to A. R. Johnson, draughtsman in the office of Meyer & O'Brien.

* *

At the regular meeting of the Chapter of Southern California of the American Institute of Architects, February 13th, Mr. John P. Krempel reported on behalf of the committee appointed in the interest of procuring property for the chapter house, presenting a list of several available lots within the city limits. The chapter gave the committee full charge of the negotiations for the desired property.

A committee consisting of Octavius Morgan, John P. Krempel and F. D. Hudson, was appointed to receive subscriptions for the purchase of the property.

Building Reports

Bank building, Watsonville, Cal. Architect, J. Marquis, Santa Cruz. Cost, $20,000. Owner, Bank of Watsonville. The plans now being completed call for a two-story brick building, second story to be used for offices. Bank front to be of plate glass, marble and bronze.

Brick lodging house, north side of O'Farrell street, 80 feet west of Leavenworth street, San Francisco. Architects, Dodge & Dolliver, San Francisco. Owner, George S. Hill. Cost, $17,000. The structure will consist of four stories and basement.

The United Railroads Company will soon build a car house on the block fronting H street and Thirteenth avenue.

City Hall, Fresno. Architect, E. Matthewson, Fresno. Cost, $75,000. The contract for this building was to have been awarded two weeks ago, but it was discovered on the day that the bids were to be opened that the call for bids had to be advertised twenty days, instead of ten days, so the Council has voted to readvertise, and now all bids must be in by March 20, 1906.

Hotel, Santa Cruz. There are rumors of a $250,000 tourist hotel to be built in Santa Cruz this summer by a corporation of Eastern and California capitalists Mr. Van Cleek, of Santa Cruz, is one of the prime movers of the project.

Publishing House, San Francisco. Word has been received from the East that it has been decided to replace the present headquarters of the Methodist Book Concern on Market street with a new and substantial building to cost $75,000 or more. The concern purchased a site near the City Hall a year ago. The local committee which is to have charge of the new building includes Dr. F. D. Bovard, R. V. Watt and C. B. Perkins, all of San Francisco.

Business block, Sixteenth street and San Pablo avenue, Oakland. Owner, Dr. Kahn, of San Francisco. Cost, $35,000. Mention of the purchase of a site for this building was made in these reports some time ago. Plans are now being prepared, and they call for a four-story building, brick and stone, with stores on the ground floor and offices and apartments above. Dr. Kahn is a brother of Fred Kahn, the Oakland drygoods dealer.

Business block, Twenty-second and Market streets, Oakland. Owner, W. H. Watkinson. Cost, $20,000. The owner will build a three-story building with stores and apartments.

Residence, Bella Vista Park, Oakland. Architect, Julia Morgan. Owner, Dwight Huntley. Cost, $6,700. Building will be a frame affair and two stories. G. W. Flick has the contract.

Addition to Academy. It is reported that the Hoffmeyer Academy will spend $50,000 in new buildings to be erected in the Claremont district, near Berkeley.

Flats, Ninth and Grove streets, Oakland. Architect, A. W. Smith, Oakland. Cost, $7,000. Owner, George Schultze. Plans for four flats have just been finished and bids are now taken. The flats will contain four and five rooms each; colonial style; two stories; pine interior finish; concrete foundations; electricity.

Hotel, Shaw's Hot Springs, Nevada. Architect, C. W. Cook, Oakland. Cost, $100,000. Mr. Cook will be ready to take figures for the brick work, tile, heating and ventilating on this job in about six weeks.

Residence, East Oakland. Architect, C. W. Cook, Oakland. Cost, $3,500. Owner, B. H. Welch. The plans for this house have just been finished. It will be colonial style, two stories, concrete foundation, shingle roof, etc.

Post Office and store building, Monterey. Designers, T. H. Dean & Co., Monterey. Cost, $12,000. Owners, Monterey Mining Company. Plans have just been finished for a one-story building, to be Mission style, built of brick. Bids for this building will be taken March 1st.

Store and apartment building, Monterey. Architect, W. H. Weeks, Watsonville, Cal. Owner, Mr. Goldstein Cost, $35,000. The plans now being completed call for a three-story brick building with steel frame. Two upper stories to be used for apartments. This building will be modern in every respect with up-to-date fixtures and plumbing.

Masonic Building, San Jose. Cost, $50,000. It is reported that Architect H. F. Starbuck and Mr. Page, architect, San Jose, will prepare the plans for this new structure.

High School, Sonora, Cal. Architects, Stone & Smith, Flood Building, San Francisco. Cost, $20,000. Plans are being drawn for a one and one-half story brick and stone building. A feature of the structure will be a tin-covered dome. There will be considerable marble used.

Schoolhouse, Berkeley. Architects, Stone & Smith, San Francisco. Cost, $50,000. This is the building for which W. H. Wharff, architect, of Berkeley, was given the contract, but whose plans were afterwards rejected because they called for an expenditure of more than $50,000.

Clubhouse, Oakland. Cost, $5,000. Architect, W. H. Weilbye, Oakland. Owner, Alameda County Automobile Club. The house is to be built on the boulevard between Oakland and Haywards. For further information, see Mr. Weilbye, George S. Strong, Dr. Rodolph, or C. J. Hesseman, all of Oakland.

Tourist Hotel, Alameda. Architects, Cunningham & Politeo, San Francisco. Cost, $300,000. Owners, Syndicate in which the following are largely interested: E. A. Phelps, 1739 Central street, Alameda; George W. Scott, E. A. Phelps and W. E. Wettis, all of Alameda. The hotel is to be built at the corner of Union and Grand avenues.

School, Twenty-third and Fair Oakes, San Francisco. Architects, Martins & Coffey, Flood Building, San Francisco. Cost $25,000. Owner, Rev. P. R. Lynch, San Francisco. The same firm has plans for two-story frame flats to be built on Fillmore street for Andrew J. Clunie at a cost of $17,000.

Los Angeles (special). The following new work is being turned out in the office of Architect A. F. Rosenheim, Hellman Bldg., Los Angeles. Residence Arlington avenue, in Winchester place. Owner, John Houge, Esq. Cost, $25,000, including garage. Fourteen rooms, hardwood finish, sanitary plumbing, tile roof; all modern conveniences. Contract for general work let to F. O. Engstrom Co.

Residence, Ocean and Montana avenues, Santa Monica. Owner, D. A. Hamburger, Esq. Stable and garage will also be built. House has fourteen rooms; Mission style; cement plaster exterior; tile roof; hardwood finish; sanitary plumbing, etc.; modern in every respect. Cost, $20,000.

Residence, Rampart Heights. Owner, Frank R. Strong, Esq. Cost, $18,000. Plans are in preparation for a twelve-room residence, stone first story, siding second story; tile roof; hardwood finish; all up-to-date conveniences.

Alterations to building at northwest corner Fourth and Spring streets. Also fixtures, fittings and decorations of store rooms for The United Cigar Stores Company. Contracts to be let this week.

Six-story, reinforced concrete building, Broadway, between Fourth and Fifth streets, Los Angeles. Architects, Morgan & Walls, Los Angeles. Owners, The Bumiller Estate. Plans are now in preparation.

New Civic Center Building, Market and Van Ness avenue, San Francisco. Cost, $150,000. Architects, Meyers & Ward. Owner, White Sewing Machine Company. Reference to this building has already been made in these reports Contract for the foundation has been let. Building will be four stories, built of brick and terra cotta; stores and loft; felt and gravel roof; elevator.

Fireproof building, Ninth and Mission streets, San Francisco. Owner, James Conlon, San Francisco. Cost, $60,000. Mr Conlon has recently bought the property on the Easterly line of Ninth street, north from Minna, and plans will be prepared at once for a five or six-story brick fireproof building.

Alterations to State Capitol, Sacramento. Architects, Sutton & Weeks. Plans and specifications for the various improvements and additions to the State Capitol are finished and contractors can see the plans at Sutton & Weeks's office, 510 Montgomery street, San Francisco. Bids must be in by March 15th. The total cost of the improvements will run close to $1,500,000. All contracts are to be let separately.

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EDITORIAL

AN UNSATISFACTORY ORDINANCE

The San Francisco Supervisors again have shown poor judgment in passing to print an ordinance which provides a general plan for the construction of all public buildings erected in the city. The measure provides, among other things, that the architect whose plans are accepted immediately becomes the consulting architect for the work. It then calls for the appointment of a supervising architect by the Board of Public Works, who shall be put in full charge of the construction of new buildings.

It is hardly to be expected that our best architects will care to prepare plans for a public building under such an ordinance. A supervising architect would, of course, come directly under the control and dictation of the Board of Public Works. The board, if it chose, could boss the supervising architect, and the latter, in turn, could boss the consulting architect or the man who drew the plans. We doubt if the average reputable architect would care to thus lower his professional dignity by being called upon to follow the dictates of some one perhaps less competent than himself.

A still more unsatisfactory feature of the new ordinance is the section providing compensation for the consulting and supervising architects. To quote: "The consulting architects shall receive three (3) per cent of the cost of the building for which he shall have been appointed such consulting architect, and the general supervising architect two (2) per cent of such cost, where the cost of such building shall be $100,000 or less. Where the cost of such building shall be over $100,000, the consulting architect and the general supervising architect shall each receive two and one-half (2½) per cent of such cost. The payments herein provided for shall be in full and complete payment of all services rendered by such architects in anywise in or about the plans or construction of such buildings."

Again we seriously question whether our best architects would care to seek this public work when the compensation is only about half of the commission he gets for general work. Just why the city should not be willing to pay as much as the private builder to get the maximum of good results is not quite clear. The ordinance ought to be repealed.

❖ ❖

GLASS HOUSES ARE COMING

The prospects are that the time is not far distant when people who live in glass houses may throw all the stones they care to without fear of consequences to their own domiciles, as there are strong indications that the glass house may be a reality before many years have rolled by. It is a possibility now, but would be rather expensive. Glass paving bricks have been successfully used. Hollow glass house bricks are made; glass foundations are more durable than stone; and there is glass roofing, glass gas pipes, glass kitchen and bathroom equipments, and glass furniture.

❖ ❖

COMPETITIONS

Owing to the smallness of commissions and the great expense of maintaining an office, architects should take the matter of competitions under very serious consideration. The cost of maintaining an architect's office has increased materially in the past few years—rents are higher, draughtsmen demand better wages, better results in beauty and practicability require more time for study, and yet the fees are no greater than they were several years ago. This being an established fact, the question of adding to these expenses by entering competitions is of vital interest to all members of the profession.

Competitions waste money. If the non-successful competitors are not paid, they lose. If they are paid, the client is paying for something that he does not get.

Despite these facts, it was the concensus of opinion of the Institute of Architects, as expressed at their last meeting held recently in Washington, that competitions are a necessary evil, but which, when held, should be under circumstances as mitigating as possible.

That they are an evil is proven by the experience of such well-known architects as Mr. Cass Gilbert, Mr. George B. Post, Mr. John M. Carrier and Mr. Andrews, etc. Their experience has been that competitions require an expenditure greatly in excess of the recompense—Mr. Carrier stating that he had lost thirty-five out of forty; that the client rewards the successful competitor on his ability as a draughtsman, not as an architect. This is demonstrated by the well-known fact that competition drawings are never built until they are re-drawn out of all recognition.

Competitions are necessitated by the lack of unity among the architects. This is not to be wondered at when "architect" in the United States means anything from a carpenter to a landscape gardener.

The mitigating circumstances are well covered by Mr. W. B. Mundie in his address before the Institute, as follows:

> The American Institute of Architects recommends that, wherever possible an architect be employed without a competition. When a competition is deemed necessary, the procedure must be in accordance with the following code.
>
> *Form of Competition.*—(A) The competition must be limited to a certain number of architects, each of whom is invited to take part.
>
> (B) Each competitor to receive a certain sum of money to reimburse him for the expense incurred, this sum to be agreed upon between competitors and prospective client, and this sum to be paid to each competitor other than the one awarded the commission, or a prize, as prizes are agreed upon.
>
> (C) The author of the design receiving the first mention by the jury must be employed to design and superintend the erection of the building.
>
> *Jury of Award.*—The jury of award must consist of not less than three members and a majority of the jury must be members in good standing in the American Institute of Architects, and the entire jury of award is to be agreed upon between competitors and prospective client.

Programme.—The programme must be drawn so as to form a contract and be signed by all competitors and by the prospective client.

Rules of Conduct.—(A) All designs must be signed by the name of the competitors submitting designs.

(B) No member of the American Institute of Architects shall enter a second competition for the same building unless he was a competitor in the first competition.

(C) No change or deviation from this code shall be permissible until such change shall receive the sanction of the executive committee of the Institute.

(D) It shall be deemed unprofessional for any member of the American Institute to violate any of the provisions of this code.

(E) It shall be deemed unprofessional for any member of the American Institute to enter any competition based upon this code with any competitor who has once been censured for unprofessional conduct in competitions conducted under this code.

Remember that the members of the Institute are not to be governed by the actions of the Institute. It is purely a dice-box, black-and-red game, and not a gentleman's game. We do not say you shall never have competition. We say that "Wherever possible, an architect be employed without a competition." An owner does not want that.

"The competition must be limited to a certain number of architects, each of whom is invited to take part." A possible criticism of that is that a young man would never get a chance. But what he has to do is to wait a little longer. If he has it in him, he will get his chance. There is room at the top.

"Each competitor to receive a certain sum of money to reimburse him for the expense incurred, this sum to be agreed upon between competitors and prospective client, and this sum to be paid to each competitor other than the one awarded the commission, or a prize." That brings it down to a business basis. "The author of the design receiving the first mention by the jury must be employed to design and superintend the erection of the building." Any owner who will not agree to that has a sinister motive for wanting a competition.

"The jury of award must consist of not less than three members and a majority of the jury must be members in good standing in the American Institute of Architects, and the entire jury of award to be agreed upon between competitors and prospective client." No one will differ from that.

"The programme must be drawn so as to form a contract and be signed by all competitors and prospective clients"—that from a business standpoint nobody could object to.

"All designs must be signed by the name of the competitors submitting designs." You may say Why, then, they will know who the competitors are. Certainly. Why should they not? It is an insult to an intelligent juror on the face of it, for it implies that they would have favor for their friends. At the Carnegie Institute, for example, the pictures are signed and the jury are mainly artists, but no one thinks that the jury are swayed by the knowledge of who the competitors are.

"No member of the American Institute of Architects shall enter a second competition for the same building unless he was a competitor in the first competition." That will prohibit the annuling of the competition where an award is made to someone whom the owner does not favor. He is then put into a position of picking the man. An owner under this code organizes the competition; if he is not satisfied, he can pick his man.

The rest of this is purely on unprofessional conduct. We have to arrange our laws so that the cure will apply and apply quickly, and not appear in the convention poceedings two years afterwards when nobody knows anything about it.

If competitions must be held, let it be under the above conditions, but it would be well for the architect and the client if they could realize that competitions only show the architect's skill and do not solve the problem; that the architect's skill is much better shown by his work than by his drawings, and that they are both undergoing a useless expense.

CHARLES PETER WEEKS.

✣ ✣

TEST FOR DRAUGHTSMAN.

The United States Civil Service Commission announces an examination on March 21-22, 1906, at the places mentioned in the accompanying list, to secure eligibles from which to make certification to fill vacancies as they may occur in the position of topographic draftsman in the Post-Office Department, at $900 per annum.

As the Commission has experienced considerable difficulty in securing eligibles for this position, none having been secured as the result of the examination held on January 3-4, qualified persons are urged to enter this examination.

✣ ✣

"House Hints for Those Who Build, Buy, Improve or Rent," is the title of a very interesting book, by Architect C. E. Schermerhorn of Philadelphia. It is a practical treatise descriptive of every essential detail pertaining to site, location, arrangements, construction, plastering, heating, plumbing, lighting, decorating and furnishing of the house and should prove a valuable help to the house-builder. Address House Hints Publishing Company, Philadelphia.

✣ ✣

THE MAN WORTH WHILE.

It's easy enough to be pleasant
  When life flows along like a song,
But the man worth while
Is the one who can smile
  When everything goes dead wrong.

—Exchange.

The Publisher's Corner

THESE MEN OWN THEIR JOBS.

In these days of trusts and combinations of great aggregation of wealth, and autocratic industrial power in the hands of a few, it is actually refreshing to happen upon a manufacturing enterprise proceeding in the opposite direction.

The above picture shows a group of mechanics who legally and actually "own their own jobs." Instead of being dictated to by a boss, they themselves elect a manager, and his policy conforms to their ideas and wishes.

Such a plan is a startling innovation to the average business man. It will also sound strange to many professional men. We are accustomed to the prevailing industrial methods where the proprietor or manager decides all important matters and issues orders to subordinates. It is not often that we see in America a successful co-operative manufacturing enterprise. It is indeed quite surprising to find one in a comparatively new part of the world, where opportunities for individual effort are supposed to abound.

The group in the picture is a part of the stockholders of the Inlaid Floor Company, organized at San Francisco in 1897. There were but five at the beginning, and the combined capital of them all was less than $2,000. But by their skill and industry and honorable dealing these five won the respect and confidence of the building trade and the appreciation of every patron. As the field enlarged new members were gradually added to the list of stockholders from among the employees of the company, until now the investment is over $35,000.

No stock has been sold by the company to any one not actively engaged in the business, and none has ever been offered to any one but an employee who has by service demonstrated his fitness as a mechanic to take his place on an equality with the others. No one is sold more than a limited amount of stock, that the original idea of equality shall be preserved.

To-day the Inlaid Floor Company, owning a well-equipped factory free from incumbrance, with offices at Portland and Seattle, stands as an example of what workingmen can do in the business world.

Since 1897 the standard of work maintained at San Francisco and surrounding cities in the hardwood floor line by the Inlaid Floor Company is not excelled anywhere in the United States. It is doubtful whether its record has ever been equaled anywhere. And during this period the prices of hardwood floor work at San Francisco have been no more and even less than is obtained for the same work on the Atlantic seaboard.

The secret of this uniform success, financially, as well as the well-earned reputation of the Inlaid Floor Company, lies in its co-operative make up. Previous to its formation every one who engaged in this line of business at San Francisco failed to make it successful. It is probably within the truth also to say that no where else in the United States has any individual enterprise in the same line of business during the same period equaled the record of this co-operative venture of working men.

Direct dealing from the mechanic, the manufacturer in fact to the actual consumer, the elimination of highly paid officers, and the modest expectations of the promoters, have all contributed to the success of this company. But probably the greatest source of the company's progress has been its bringing into direct contact with patrons an actual member of the firm competent to execute the work desired and careful to promote the common interest.

The original incorporators have ambitious plans to organize under their banner branches in other large cities. They keep open the door of opportunity to all who are regularly employed to join them, and hope thus to aid other workingmen in the march of labor to better conditions.

The manager of the company believes in the "spirit of service," as he calls it, as the happier philosophy of life. His idea of serving his fellow man best is to see to it that they actually and legally "own their jobs."

It is difficult to see how such an institution can fail to have satisfactory results to both the mechanic and the consumer. The mechanics are selected by men of their own trade who know who are the fittest. The good workmen who are steady are all given an opportunity, after sufficient time of service, to become part owners in the industry on equal terms with the original promoters.

The patrons of the Inlaid Floor Company can thus rely upon having the attention of responsible and first-class workmen. That the co-operative plan has been a success from the consumers' standpoint is manifested more clearly by the many letters of commendation which have voluntarily been sent to the manager and by the further fact that the Inlaid Floor Company has a most excellent reputation among the architects and builders, and references galore in and out of town among those owning fine residences.

* *

Ten years ago Mr. J. H. Burnett commenced his career in Fresno as foreman of a small iron foundry. By earnest effort and constant industry he has built himself up until he now owns one of the largest and best equipped plants in the San Joaquin Valley. The enterprise is known as the J. H. Burnett Iron Works. It employs an average of twenty men the year around, pays out a small fortune in wages annually and makes a fine line of work from steel, iron and cast iron. It has done so well that it is soon to be enlarged with a new foundry, having two cupolas and a large traveling crane.

Mr. Burnett manufactures architectural and structural steel, including ornamental iron works of all kinds. He will also undertake work in wrought and cast iron, and all kinds of castings are made to order.

Structural and machine castings are a specialty in his works. In fact, this is a well-equipped iron plant, having facilities to handle promptly any kind of orders in the lines mentioned, or that may be called for.

It is entirely reasonable and probable that in the near future Mr. Burnett will maintain at Fresno one of the largest and most prosperous plants on the Pacific Coast.

He has been a valuable citizen of Fresno county for twenty-seven years.

* *

The cement or concrete fence post is receiving more attention now than ever before. In an interview T. A. McMurtrie of Los Angeles expressed his views on the concrete post as follows:

"I believe there is room for improvement in the construction of concrete posts as manufactured at present. The solid post, if made the usual size of fence posts, would be heavy and apt to lean over in soft ground. I notice some manufacturers of concrete fence posts recommend the use of twisted wire or gas pipe for reinforcement. I have been making some experiments along this line at our works in Los Angeles. The solid post I reinforced with ¾-inch gas pipe the full length of the post. The hollow post I reinforced with four strips of galvanized iron ¾ of an inch in width, placing one near each corner of the post, both being 6x6 inches at the lower end and 3x3 inches at the top. The hole in the hollow post was 3x3 inches at the lower end and 1x1 inch near the top.

"My experiments have demonstrated the superiority of the hollow post. I have noticed some tests made of fence posts by dropping a heavy weight upon the post a sufficient distance to break the post, then testing a wooden post of the same size in a like manner.

"This I do not regard as a fair test of the concrete post, the density of the two materials being widely different. A better and a fairer test would be to place a gradual strain, such as would be required in a fence. The hollow concrete fence post can be made at a cost that would compare very favorably with a good wooden post. One important thing in manufacture of artificial stone, particularly a long piece, such as a fence post, is that it should be made on a smooth level floor or on a straight thick plank. Remove the mold or form from the fence post and allow it to remain undisturbed until thoroughly hardened. This will avoid cracking, as would necessarily occur in handling or moving the newly made product. Thorough mixing and tamping of the material into the forms is, of course, of great importance."

One of the latest artificial building blocks to be turned out has recently been placed on the market by Reed & Kimball, of Antioch. It is known as the Economy Artificial Building Stone, and has six complete surfaces and a perfect bond between each. It has a hard, durable surface, and can be made in any form or color. The surface of this block is furnished with any required design of contour or coloring, to suit the parties interested in the structure to be erected. The bearing surfaces, top and bottom, are complete, giving full and perfect (as though wholly solid) support to the next course of blocks above each tier. The interior of the block is a system of cylindrical arches which are as capable to support the overlaying weight as the same volume of the original composite. By this means we can give, to illustrate, any block being of a solid and having a tensile value of 18,000 pounds to the square inch; the same tensile value and same carrying surface for less than one-half the material; that is, to wit: A block 18x16x 14—4,032 cubic inches of solid granite, marble or concrete; Economy artificial stone has the same tensile value for 1698-45.100 cubic inches of material used.

Kimball & Reed would be glad to furnish estimates on the cost of any kind of artificial stone work, and any communications to the firm should be addressed to Antioch, Cal.

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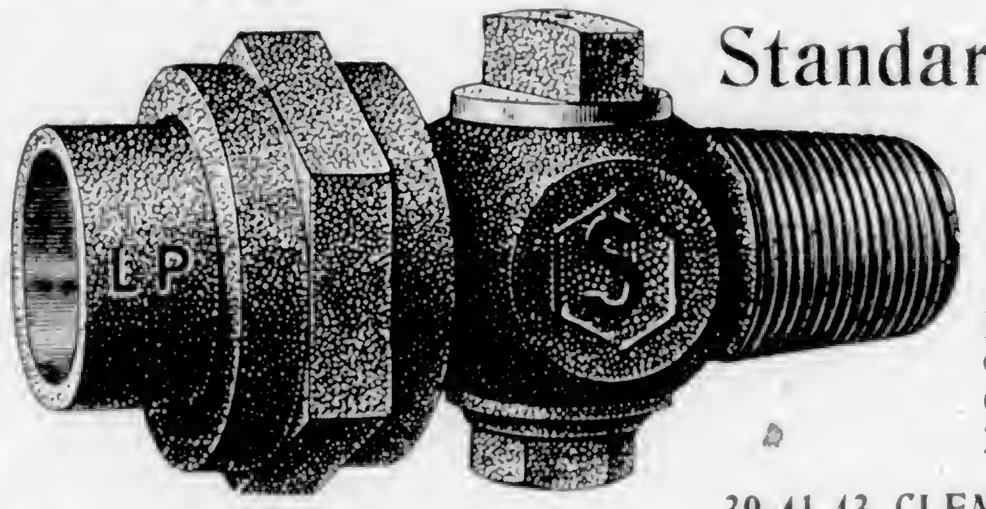

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To the Pacific Stone Company, Crossley Building, this city, has been awarded the contract for furnishing the material chosen for the facing of the exterior of the basement walls of the Fairmount Hotel. This material is a manufactured concrete stone, made under the Stevens patents, and known to the trade in the East as Litholite or Roman Stone. It is a poured concrete cast stone, composed of materials selected for qualities that make it a very valuable and a very beautiful building material. It is made in any form and dimension required by architects, and in various finishes. The Roman Stone for the above work at the Fairmount Hotel is to have a granite finish to match the natural granite of the first story of Mrs. Oelrich's beautiful building.

The Pacific Stone Company has also secured the contract, and will at once begin the construction of a factory building at Black Diamond, Contra Costa County, for the Redwood Manufacturers' Company, which latter company is increasing the size and capacity of its already immense plant at that point. The new building will be constructed of concrete stone, on the "hollow block" plan, and will be 200 feet long by 80 feet wide. The features of strength, durability, fire resistance and economy of construction decided by the Redwood Manufacturers' Company in its choice of the material offered by the Pacific Stone Company, and the selection is but another indication of the great favor into which concrete construction, in all its forms, is growing on the Pacific Coast.

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A good example of the modern concrete block building is found in the Oluf Warehouse, just completed in Fresno. The building is owned by Mr. O. B. Olufs, who is secretary and one of the owners of the Valley Artificial Stone and Cement Works, whose blocks were used in the construction of the warehouse.

The building covers 14,000 square feet, and is absolutely fire-proof, having a cement floor and a concrete vault with accommodations for an immense quantity of goods. Not only is the warehouse fireproof, but it is very nearly cold storage. There are ten entrances. It took 3,500 building blocks to complete the structure. It was built and designed by the owner at a cost of $6,000. It is probably the most substantial warehouse of the kind in the West. It is within easy reach of the business center of Fresno and close to the Santa Fe railroad tracks.

The works of the Valley Stone Company are close by, and a good sized force of men is kept busy most of the time turning out material for a growing industry.

* *

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In order that it might absolutely control the character of a definite section, the Claremont Park Company has there purchased nearly two hundred and fifty acres of land. Famous architects and landscape gardeners were called in to create a comprehensive scheme of improvement. Under their direction wide avenues have been laid out, large areas parked, street trees planted, sewer, water and gas systems installed and massive stone gateways and bridges built.

Following this development work the organizers of the Claremont Park Company set to work upon a hotel enterprise, and have only recently selected the plans of C. W. Dickey, of Oakland, which involve an expenditure of nearly $300,000. They have also made arrangement for the extension of the Key Route service to the entrance of their property, which brings it within thirty-five minutes of the San Francisco ferries.

Wise building restrictions guard against the erection of undesirable houses and flats. Apartment houses and business of every kind are barred. When the work of development is completed, Claremont will merit more than any other residence section "The City Beautiful."

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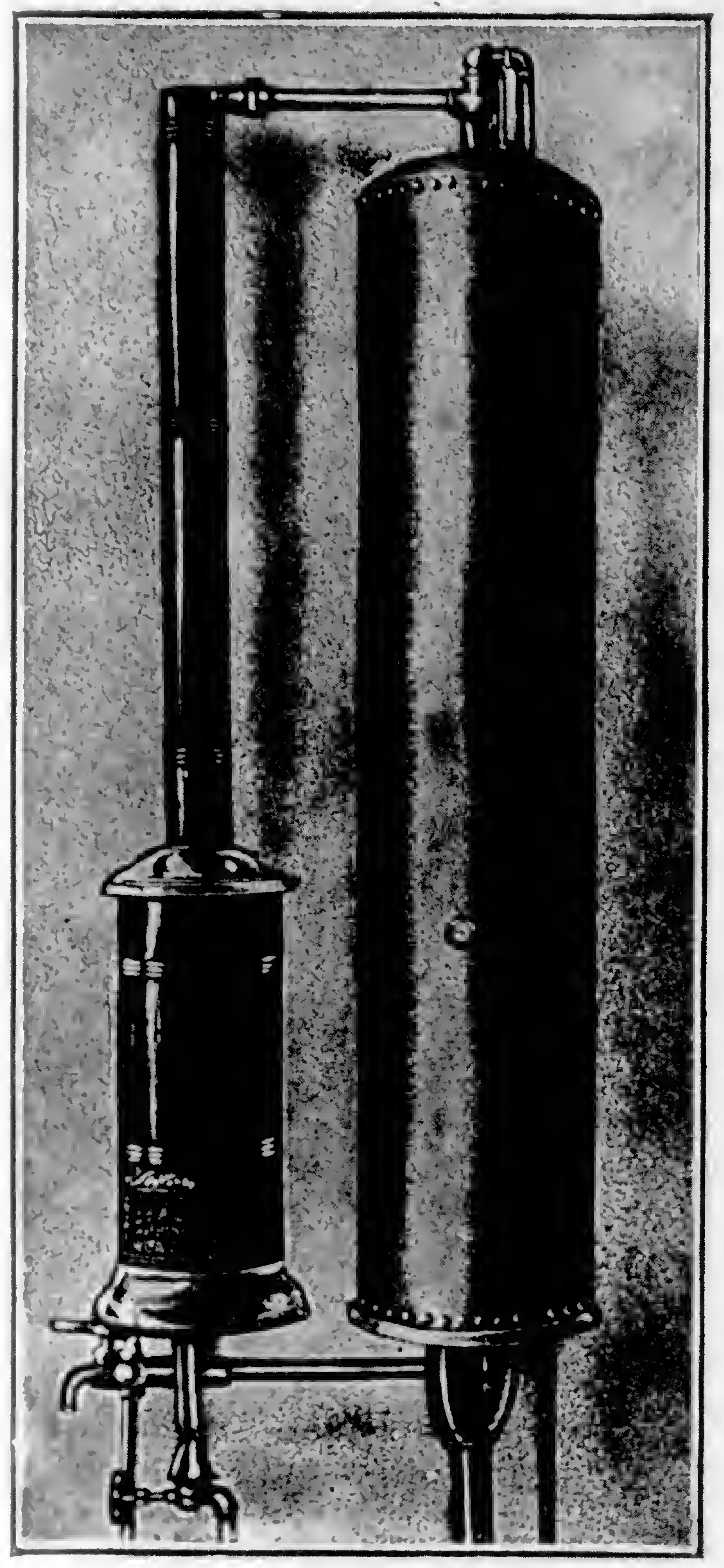

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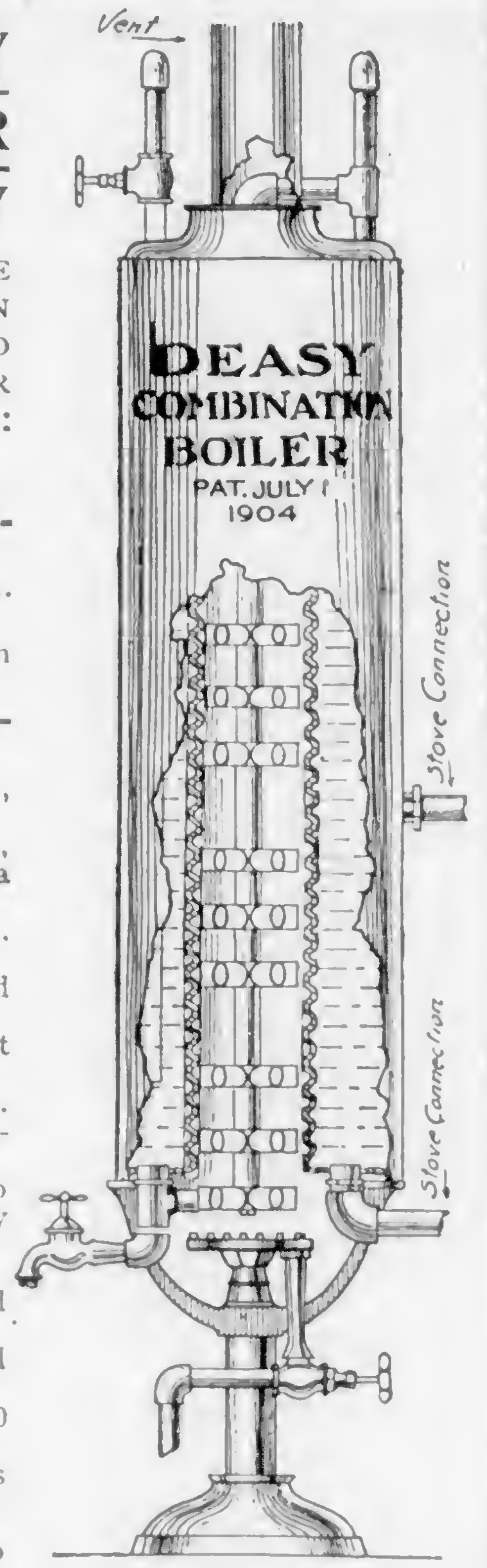

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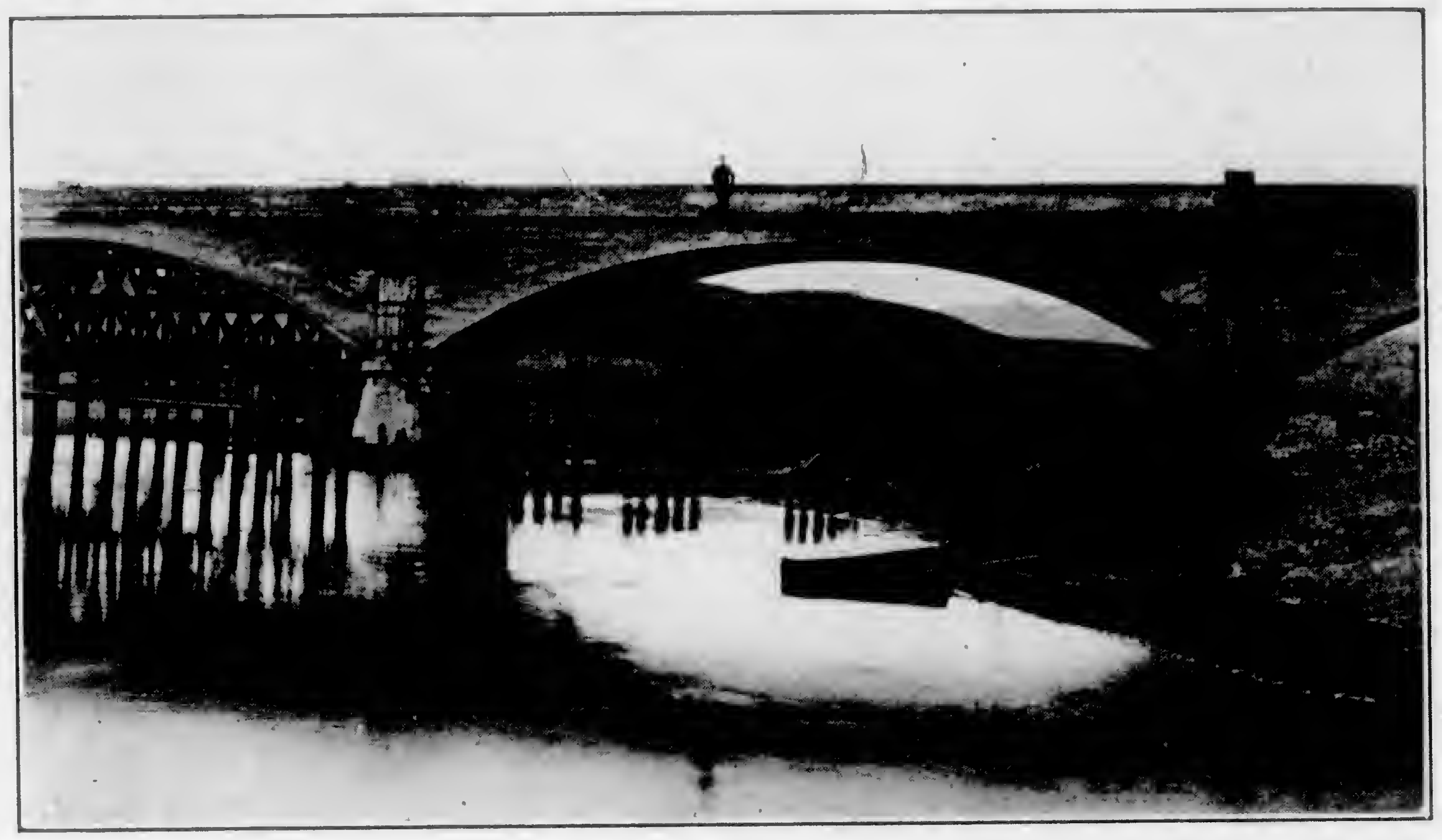

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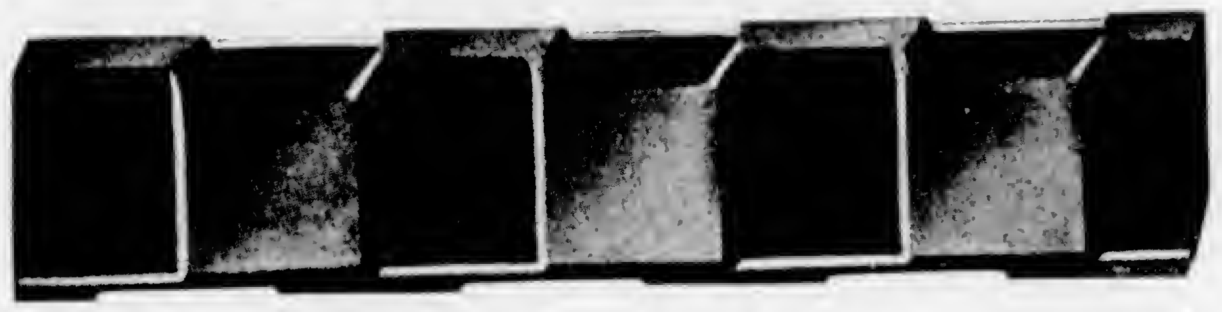

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Fred Jurgewitz, whose advertisement will be found in this number of The Architect and Engineer, is fast gaining an enviable reputation in the manufacture of staff and stucco work and plaster ornaments for both interior and exterior decoration. His plant at No. 1017 East Sixteenth street, East Oakland, is one of the most complete of its kind on the Coast. Mr. Jurgewitz carries in stock a large number of new and original designs in plaster ornaments. For those wishing their material made to order ample facilities are at hand for filling the order, no matter how portentous it may be. The plaster ornaments include mantles, ceilings, cornices, centerpieces, mouldings, brackets, gables, friezes, carved panels and capitals.

Mr. Jurgewitz has spent ten years in this line of business, and in that time some of the largest and costliest buildings in Alameda County have been beautified with work from his studio. Mr. Jurgewitz's reputation, in fact, extends outside of Alameda County, San Francisco and other large cities in the state sharing with Oakland the fruits of this well-known artist's efforts. Some of Mr. Jurgewitz's work in which he takes more than common pride is the exterior of Mr. J. R. Glascock's residence at the corner of Walworths and Monte Vista avenue, the Hodge Building at the corner of Fairview and Adeline streets, Lorin, and the entrance of the Park Theatre, in Alameda.

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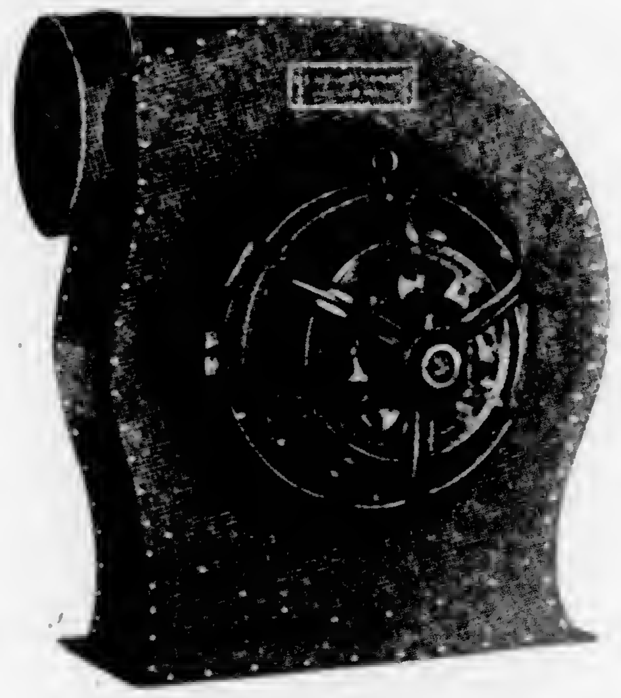

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One of the finest electrical salesrooms in the State outside of San Francisco can be seen in Monterey at the Globe Electrical Company, 232 Alvarado street. The company recently moved because of an increase in its business, and in fitting up its new salesroom spared no expense. This has been decorated and fitted under the direction of Mr. W. H. McConnell, the manager and president of the company.

The stock of electrical supplies carried by the Globe Electrical Company is as complete as can be found anywhere in the State, and the prices offered are as low. With these conditions in the trade in Monterey there is no reason for outsiders to go abroad to purchase their furnishings.

The firm carries everything in the electric line from a doorbell to a dynamo, and is prepared to give figures on all kinds of electrical work.

The Redwood Manufacturers' Company of Oakland announce in this number that they have in stock at the present time an exceptionally large number of handsome panel doors in pine and redwood. This company is making a specialty of doors and windows, as well as outside and inside finish and millwork in either redwood or pine. The company's lumber yard is at Black Diamond and is one of the largest in the world. Mr. W. A. Boscow is the popular manager of the Oakland office, to whom all communications should be addressed.

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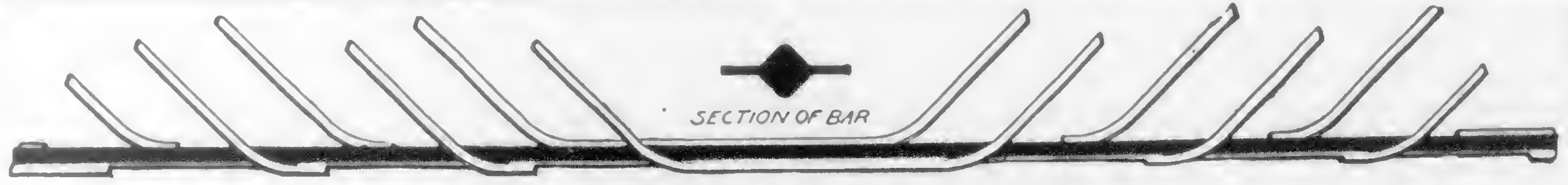

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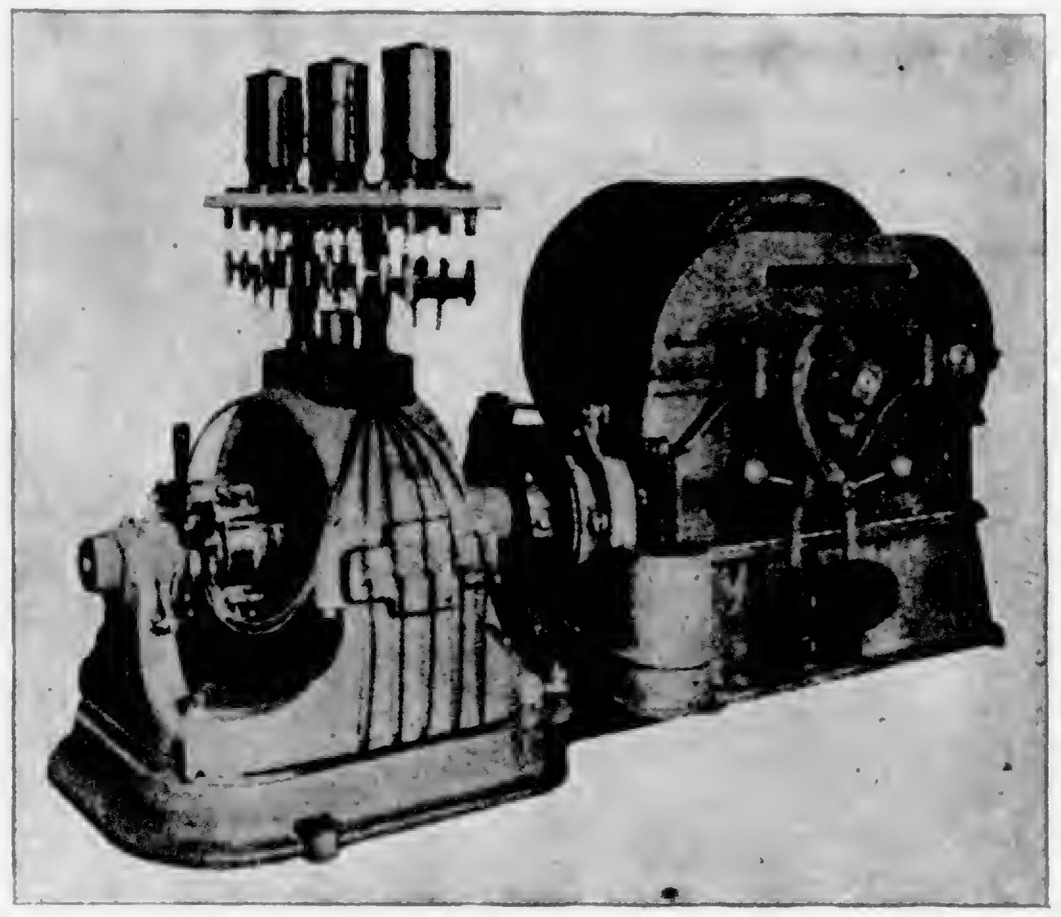

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Contents for April

PAGE.
Frontispiece—Hon. James D. Phelan.
San Francisco—An Historical Sketch....... *Hon. James D. Phelan.* 19
The California Bungalow.................. *Una Nixon Hopkins.* 33
Heraclee 41
Relative Cost of Brick and Frame Structures.. 44
TERRA COTTA AND BRICK—
Different Kinds of Brick .... *W. E. Dennison.* 45
Hollow Terra Cotta for Country Buildings.. *Geo. E. Walsh.* 47
The Universal Building Material........... *F. W. Fitzpatrick.* 51
I Am a Brick. (a Poem). .... *W. E. D.* 58
California's Garden Spot 59
Some Sacramento Architecture 61
HEATING, LIGHTING AND ELECTRICAL WORK...
System of Ventilation and Heating .... *F. H. Bryant.* 65
No Evidence of Insanity 71
Damp Resisting Compounds .... *Harry Larkin.* 73
Signing Architecture 74
Apartment-House Construction.............. 75
A Palatial County Home .... *F. W. J.* 78
To Build Fine Art Gallery 78
CEMENT AND CONCRETE—
Reinforced Concrete Construction in the... Marysville Public Library .... *M. C. Couchot, C. E.* 81
Curing Concrete Blocks.................. 83
A Paper Mill on the Pacific Coast of Reinforced Concrete....................... *F. W. Butler.* 85
Educating the Public....................... 87
INTERIOR DECORATION—
The Living-Room......................... *C. Walter Tozer* 89
Taste in Household Decoration 90
AMONG THE ARCHITECTS—
Goes to Paris (a Communication).......... *A. Dodge Coplin.* 91
Concrete Reservoirs...................... 91
Building Reports......................... 91-93
EDITORIAL—
Houses of Concrete .... *F. W. Jones.* 94
A Word to Home-Builders................ 95
The Skyscraper in California............. *F. W. Jones.* 95
Hollow Blocks—Good and Bad .... *William B. Jester, C. E.* 95-96
THE PUBLISHER'S CORNER 97

HON. JAMES D. PHELAN

THE
ARCHITECT AND ENGINEER
OF CALIFORNIA

VOL. IV. APRIL, 1906. No. 3.

San Francisco—An Historical Sketch

By JAMES D. PHELAN

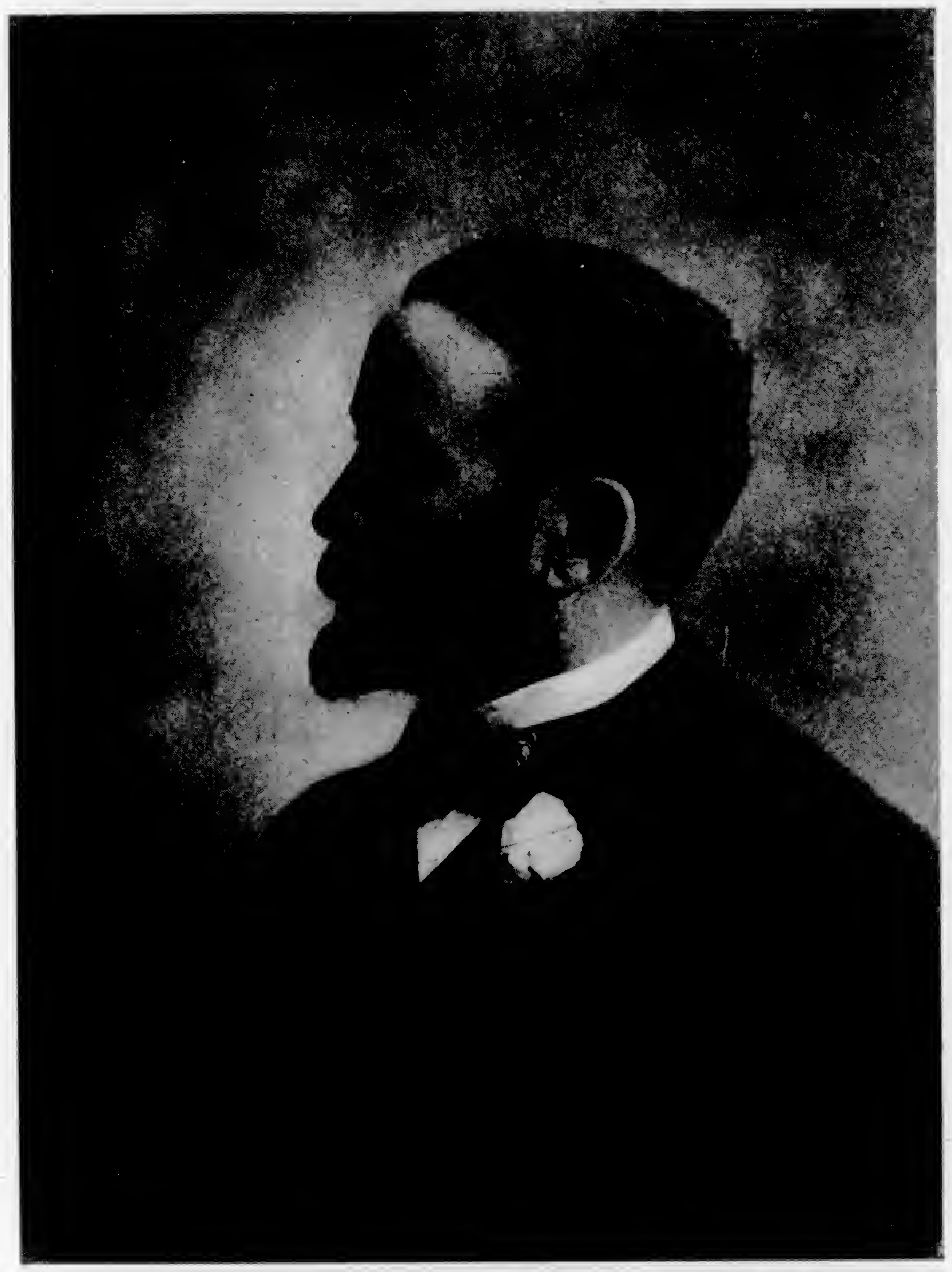
Former Mayor James D. Phelan has written an extremely interesting historical sketch of San Francisco for publication in the official report of the D. H. Burnham plan. Advance sheets of Mr Phelan's report were furnished this magazine and they are published herewith, together with a few pertinent illustrations of San Francisco—past and present, generously loaned by the publisher of the Merchants' Association Review. Mr. Phelan is president of the Association for the Improvement and Adornment of San Francisco. It is the fond hope of the former mayor that he live to see realized, at least a fair beginning of this splendid enterprise.

SAN FRANCISCO has been greatly praised for the beauty of its situation, but apart from that, its site was a wind swept and sandy peninsula, and it required much labor, not always well directed, to make it a habitable place. James Bryce in his "American Commonwealth," written in 1889, says: "Few cities in the world can vie with San Francisco either in the beauty or in the natural advantages of her situation; indeed there are only two places in Europe—Constantinople and Gibraltar—that combine an equally perfect landscape with what may be called an equally imperial position;" but Don Pedro de Alberni reporting, in July, 1796, to the Viceroy of Spain, states that there is little wood on the peninsula of San Francisco; no water nor arable lands, and that, therefore, in his opinion it is the "worst place or situation in California for the establishment of such a villa as is proposed by the Senor Contador, Don Jose M. Beltram." (Dwinell's Colonial History, Addenda p. 18.)

The location of cities is not determined, however, by selection so much as by events. Yerba Buena, the original name of the port of San Francisco, was located in a sheltered cove, between Telegraph and Rincon Hills, with deep water off shore, convenient to the Golden Gate, or narrow entrance from the sea; but the only back country was the stretch of land between the ocean and the bay extending southerly into Santa Clara Valley.

It can be well understood how many pioneer settlers, among them General W. T. Sherman and Thomas O. Larkin, United States Consul at Monterey, believed that the principal city on San Francisco bay would spring up at the head waters of navigation near the confluence of the great rivers of the Sacramento and San Joaquin which debouch into the bay at or near Benicia. Back of Benicia was the richest mining country, and river navigation was the familiar means of transportation.

But Benicia, auspiciously begun, has made no progress in half a century and is still a mere village, while San Francisco is a world city of commanding importance—the chief port of the United States on the greatest of the world's oceans.



HON. JAMES D. PHELAN

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Why the one was preferred over the other shall never be known—sufficient to say, San Francisco found favor in the eyes of the men of commerce and trade before the days of railroads; had, however, the western railroads been under way at that period (they did not come until 1867) there might have been a different story to narrate, for San Francisco, for the most part, is accessible to transcontinental lines from the mainland shore of the bay only by means of ferries—usually an impediment to traffic. But some cities, predestined to greatness, overcome all impediments and so prove their necessity and fitness.

General Sherman tells in his Memoirs (p. 55) how Dr. Semple and others, in 1847, believed that the great city of the Bay of San Francisco would rise on Carquinez Straits; how General Vallejo gave them title to a league of land on condition that the city should bear the name of Vallejo's wife, Francisca; how, soon after the name of Yerba Buena was changed to the City of San Francisco, by Alcalde Bartlett, in order to checkmate the founders of Francisca, thus forcing them to rename their town site, Benicia, the second baptismal name of the Senora Vallejo. Now, this is what General Sherman says: "I am convinced that this little circumstance was big with consequences. That Benicia was the best natural site for a commercial city I am satisfied; and had half the money and half the labor since bestowed on San Francisco been expended at Benicia, we should have at this day a city of palaces on the Carquinez Straits. The name of 'San Francisco' fixed the city where it now is, for every ship in 1848-49, which cleared from any part of the world, knew the name of San Francisco not Yerba Buena or Benicia, and consequently ships consigned to California came pouring in with their contents and were anchored in front of Yerba Buena, the first town."

General Sherman understood surveying and might have attained the first rank as a "builder of cities" if his "bump of location" were more pronounced. He confesses to surveying Colonel J. D. Stevenson's newly projected city "New York of the Pacific," situated at the mouth of the San Joaquin river, for which he received $500, and ten or fifteen lots, enough of which he sold to make up another $500, and abandoned the balance. This city met the fate of numberless other projects about the bay. (Memoirs p. 74.)

There must be some magnet in the site of San Francisco. As Bret Harte sang of the metropolis:

> "Thou drawest all things small or great,
> To thee beside the western gate."

San Francisco (when R. H. Dana, Jr., looked upon it in 1835) was a hilly and barren waste. The pioneer in city building had something to subdue. By him the sand dunes were dumped into the cove below Battery and Market and Montgomery and Washington streets, making a new shore line, reclaiming many acres of land from the bay and giving deep water for the wharves; but the conspicuous fault of the men at that time was perhaps a lack of esthetic sense, for instead of circling the hills with roads, rectangular blocks were laid out on their slopes. Furthermore, the city suffered from the confusion arising out of land litigation. When California was ceded by Mexico to the United States, existing property rights had to be respected, but these rights were hard to determine. It was the practice of Spain to settle its Pacific colonies by the establishment of missions, representing the religious branch; presidios, the military authority, and pueblos, (limited to four square leagues) the town or civil government. The pueblo lands of the city were sacred, and it has been decided that they were "held in trust for the inhabitants," so after squatters and judgment creditors against the city had taken possession of much public property, they were finally compelled to compromise their alleged claims by the assertion of the city's pueblo rights. (Harte vs. Burnett, 15 Cal. reports; U. S. Supreme Court, Townsend vs. Greely, 1866.) In 1856 and in 1865 the city was given the "Van Ness Ordinance" and other municipal enactments by which the public parks, places, school and fire lots and streets were finally confirmed to the people out of the public domain. But first, what is the history of Spanish and Mexican dominion?

After conferring plenary powers on viceroys and "presidents of my royal audiences" to sell uncultivated lands, the Spanish King, in 1754, added this wholesome and provident restriction, to which is due the little that the city inherited in the way of public lands: "But in regard to lands of community, and those granted to towns for pasturage and commons, no change shall be made; the towns shall still be maintained in possession of them." (Wheeler's Land Titles, p. 4.) They were inalienable. (Ibid.) By the laws of the Indies it appears that Spain was wise and liberal in its policy respecting the founding and planning of towns. "The viceroys and governors, being thereto authorized, shall lay out for each town or village the lands and lots which they may want." * * * "As the mission settlements are hereafter to become cities, care should be taken in their foundation that the houses be built in line with wide streets and good market squares, etc." Power was granted to commandants to designate common lands. (Ibid.)

After the acquisition of California by Mexico in 1821, the ayuntamiento, (the council which Spain set up in its municipalities) was authorized by the Territorial Assembly to grant lots 200 varas back from the beach, a restriction designed to save the harbor front for the common benefit.

Jacob P. Lesse, who left Los Angeles for better commercial prospects in San Francisco, built in 1836 the first house erected by an American on the west line of the present Dupont street. An Englishman, W. A. Richardson, however, had preceded him by one year, but had built a mere shanty. The cove of Yerba Buena had not at that time been surveyed but was used as a landing place by ships trading in grain, hides and tallow—20,000 hides and 2,000,000 pounds of tallow having been exported in one year. Exclusive of the Indians, there were but sixty persons living at the Mission (founded October 9, 1776) and fifteen soldiers at the Presidio.

This Mission was called San Francisco de Assis, or, sometimes, de Dolores. The Mission fathers of the Franciscan order, who gave the name of San Francisco to the bay in 1769, which they had discovered from the land, and to which they believed they were led by the patron of their order, St. Francis, converted the native Indians to Christianity. The Indian population in 1802, according to the authority of Humboldt was, male and female, 814. They were as low as any known race in the scale of humanity, but they were patiently taught useful arts. The Mission accumulated surprisingly large flocks of sheep, herds of cattle, horses and grains. In 1825 it was credited with 76,000 head of cattle and 79,000 sheep, and there was a village at the Mission which Captain Benjamin Morrell estimated to contain 500 inhabitants. The Indians were dispersed and disappeared after the secularization of the missions by Mexico in 1833, and the lands and property of the fathers were confiscated to be regranted to settlers.

In 1837 a law was promulgated for the government of pueblos which remained in force until July 7, 1846, when California was taken by Commodore John D. Sloat. Two days later the American flag was raised in the old plaza of Yerba Buena, now called Portsmouth Square, in honor of the United States ship, then commanded by Captain J. B. Montgomery, the flag-raiser, whose name was given to the principal thoroughfare.

Twin Peaks, looking out Market Street C-381

It was as early as the spring of 1839, however, that Governor Alvarado directed the Alcalde, Francisco Haro, to make a survey of Yerba Buena and in the fall of the same year Juan Vioget, a surveyor, made the first regular survey and plan of what is now San Francisco. That survey merely covered the area between Pacific, Sacramento, Montgomery and Dupont streets. It may be mentioned in passing that in 1835, W. A. Richardson claims to have made a rough plan of a small area by official authority. (The United States vs. Jose Y. Limantour. Transcript of record p. 21 et seq.) But it is gratifying to note, even at this period, in the midst of confusion, that the germ of artistic planning was not foreign to the minds of the founders, although it did not bear abundant fruit. In making grants of house lots, it was ordered that "they shall be in as good order and arrangement as possible, and as the situation of the place may require, in order that the streets and plazas which may be formed may have, from the beginning, proper uniformity and harmony."

The wagon road to Yerba Buena from the Mission was built in 1838. Then the village slumbered until awakened by the guns saluting the flag and, a little later, by the clarion cry of "Eureka!"

In March, 1847, nine months before the discovery of gold, General S. W. Kearny, after whom Kearny street is named, then Military Governor of California, ordered the sale at auction of beach and water lots, excepting those reserved by the Federal Government, "for the benefit of the town of San Francisco." Jaspar O'Farrell, a surveyor, was employed to lay them out, which he did to the number of 444, between Rincon and Telegraph Hill, in size 45 feet 10 inches by 137 feet 6 inches. These lots were designated on the official map made by Wm. M. Eddy, city surveyor. Another survey was subsequently made of 328 more lots by O'Farrell, who in trying to reconcile his work with that of Vioget experienced considerable difficulty. Vioget's lots had angles, obtuse and acute, which had to be brought into the uniform plan so that streets would cross each other at right angles. O'Farrell proposed to widen Dupont and Kearny streets, laid out by Vioget, but the expense was considered too great. Many years later these streets were widened at a large cost, the burden falling on the property one-half block distant east and west from the line of the improved street. Kearny street was widened from 45 to 75 feet, the 30 feet having been taken from the west side at a cost of $579,000. Damages and benefits were assessed by a commission. Dupont street was widened in 1878 in the same manner and renamed Grant avenue. Montgomery street was opened to Howard street, and Montgomery avenue, a great diagonal thoroughfare, was cut from Montgomery and Washington streets northwesterly to the bay—the cost of which has never been met on account of fundamental irregularity in the issuance of the bonds. None of these expenses were assumed by the city but were expressly made a district charge and the property of the district was made liable, under a prescribed procedure. It is unjust to put the whole burden of such improvements on a small district where the city is also a large beneficiary.

View of San Francisco from Twin Peaks C-382

The scandal arising out of the Dupont street and Montgomery avenue widening and extension bonds has been an injury to the city's credit, and yet the city is not responsible, and before the bonds were issued it expressly disavowed responsibility. The bond buyers were obliged to look to the regularity of the proceedings of the commissioners charged with the duty of issuing the indebtedness.

Jaspar O'Farrell also delineated Market street—an avenue which is unique among city streets in that it seems, like a great river, whose flow is augmented by many tributaries, to drain all other streets. It was given its direction by the respective locations of the town and the Mission, which it practically connected. The survey made south of Market street bore but little relation to that on the north. The historian, John S. Hittell, says that "O'Farrell correctly appreciated the importance of making the main streets in the southern part of the town agree in general direction with a route followed by people going from Yerba Buena Cove to the Mission." That was well enough, no doubt, for his period, but since then the south side has developed on independent lines, irrespective of the Mission, and it is necessary to connect it more intimately with the north side by opening new streets and diagonals.

At the period of the O'Farrell surveys the population of San Francisco was shown by a census to be four hundred and fifty-nine. This number did not include soldiers nor the inhabitants of the Mission-village of Dolores.

Then came the discovery of gold in January, 1848. The population increased by leaps and bounds. O'Farrell's lots were all sold, and, in October 1849, the ayuntamiento ordered Eddy to extend the survey to Larkin street north of Post street and south of Post to Leavenworth and Eighth streets. One hundred-vara lots sold for $500, and fifty-vara lots for $200.

In 1850 a franchise was granted for a plank wagon road from California and Kearny to Fifteenth street, by way of Mission street to the Mission Dolores. Mission was favored over Market street because the latter from Second to Fifth streets was covered by a high ridge of sand. There was a deep cut in the sand hills at Kearny and Post streets where tolls were collected. This road did not become free until 1858.

In 1851, Congress created the land commission to settle land claims in California. In taking the country, Commodore Sloat had proclaimed that persons in peaceable possession under "color of right" should be protected in their holdings. This promise was ignored by the Act and the result was that squatters entered upon lands in and about the city and became a political power. The native California rancheros lost half their holdings to the lawyers and the other half in living during the litigation, and awaiting for a patent issue—and so the Noe, Bernal, de Haro and other grants in or near San Francisco were dissipated. Just as the time limit set for the filing of claims before the commission was about to expire, in March, 1858, the Limantour, Santillan and Sherrebeck claims were filed for nearly all the property south of California street and west of Second, which after long litigation, were rejected; and Dr. Peter Smith, for medical services to the city, had a sheriff's deed following a judgment for much city property, which ultimately was invalidated by the courts in so far as it affected pueblo lands; but other properties were confirmed to him.

The boundary line of the City of San Francisco, as fixed by the act of the legislature, approved April 15, 1851, reincorporating the city, was as follows:

On the south by a line parallel with Clay street, two and one-half miles distant, in a southerly direction, from the center of Portsmouth Square, on the west by a line parallel with Kearny street, two miles distant, in a westerly direction, from the center of Portsmouth Square. Its northern and eastern boundaries shall be coincident with those of the County of San Francisco (i.e. the bay).

The westerly boundary line so fixed coincided, nearly, with what is now Devisadero street, and the southerly line with Twenty-first street.

By an act of the legislature, passed March 11, 1858, Ordinance No. 822, passed by the Common Council of the City of San Francisco, June 20, 1855, was ratified and confirmed. By this ordinance the city relinquished all claims to lands west of Larkin and Johnston (Ninth) streets, and within the boundary line, as fixed by the act of 1851, to those persons, and their successors, who had been in actual possession thereof from January 1, 1855, to June 30, 1855, and as to those lands lying east of said streets and above high-water mark, to those persons who deraigned title from grants made by the alcaldes or municipal authorities of the former pueblo.

By section 5 of the ordinance the city reserved the right to select and reserve such parts of the lands lying west of Larkin and Ninth streets, and within said boundary line, as might be necessary for public purposes, such as school houses, engine houses and squares, and in pursuance of such plan another ordinance, No. 845, was passed September 27, 1855, and likewise ratified by said legislative act, providing for a commission to prepare a plan of streets, squares and public building lots within this portion of the city.

Such a map was accordingly prepared (since known as the Van Ness map), and by another ordinance, No. 846, passed October 15, 1856, likewise ratified by said legislative act, it was "declared to be the plan of the city, in respect to the location and establishment of streets and avenues, and the reservation of squares and lots for public purposes in that portion of the city lying west of Larkin street and southwest of Johnston (Ninth) street," as defined by the charter of 1851.

By an act of Congress, approved July 1, 1864, such ordinances, and the act of the legislature ratifying them, were referred to and approved, and the United States relinquished all claims to the lands delineated on said map for the uses therein respectively designated.

The rights of the city to its public reservations thereby became fixed and determined, so far as that portion of the city lying east of Devisadero and north of Twenty-first streets was concerned.

As to the lands outside of the charter line of 1851 (i. e. west of Devisadero street and south of Twenty-first street), no action was taken by the city in the matter of confirming the title of private persons or making reservations of land for public purposes until 1868, when Ordinance No. 800, approved January 14, 1868, was passed by the supervisors. This ordinance, which was confirmed by an act of the legislature approved March 27, 1868, provided that the supervisors should immediately proceed to subdivide into blocks such portions of the city and county lying outside of the charter line of 1851 as they might deem expedient, and to make necessary reservations of lands for public building sites, squares and a park. In pursuance of this plan, the Committee on Outside Lands of the Supervisors caused to be prepared a map of that portion of said lands lying north of the Rancho Laguna de la Merced and the San Miguel rancho and of Islais creek not reserved by the United States, whereon were delineated streets, and reservations for school houses, engine houses, a cemetery, public squares, a city and county hospital and Golden Gate Park. Such map, so prepared, was finally approved and adopted by the supervisors as the city map by Ordinance No. 823, approved July 24, 1868, and has since been known as the Humphreys map.

By said Ordinance No. 800 the title of the city to lands outside the charter line of 1851, and not embraced in Spanish grants, such as the San Miguel rancho, nor reserved by the United States, nor by the city for public use, was relinquished to such persons who were in actual possession thereof on March 8, 1866, and had paid taxes thereon for five years next preceding July 1, 1866.

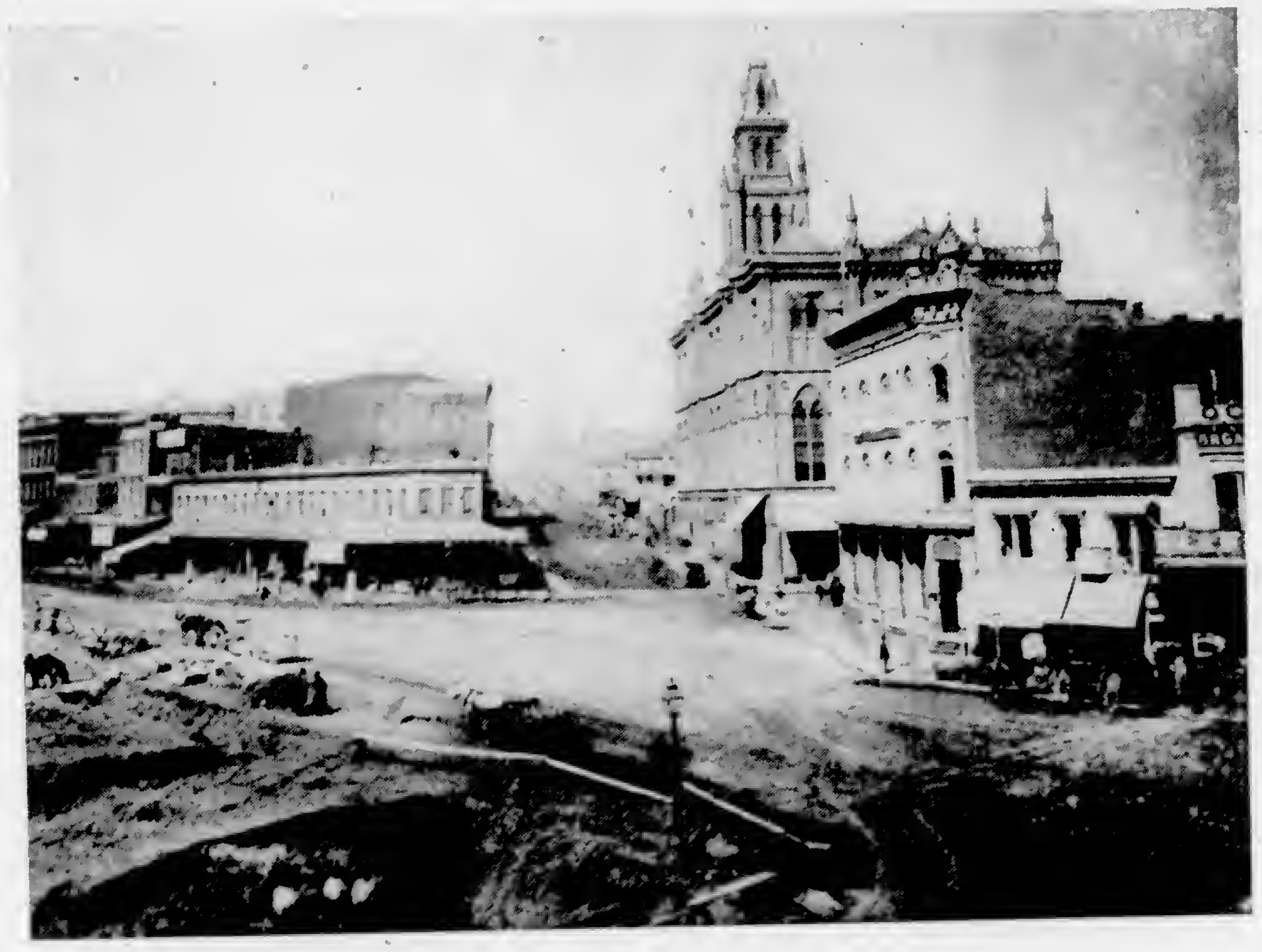
The title to this territory was thereby settled and fixed, and the right of the city to public property lying therein determined.

All of the other lands lying outside of the charter line of 1851 are embraced within what were originally Spanish ranchos, the title to which was derived directly by grant from the Spanish or Mexican governments, namely, the Rancho Laguna de la Merced, San Miguel Rancho, Rancho Rincon de las Salinas y Potrero Viejo, and the Rancho Canada Guadalupe Rodeo Viejo y Visitacion. Various persons and corporations deraigning title through these different grants at different times filed and recorded maps of tracts lying within their boundaries, whereby the streets thereon delineated were dedicated to the city, the most prominent of these being the Horner's addition, O'Neil and Haley tract, and the South San Francisco Homestead Association.

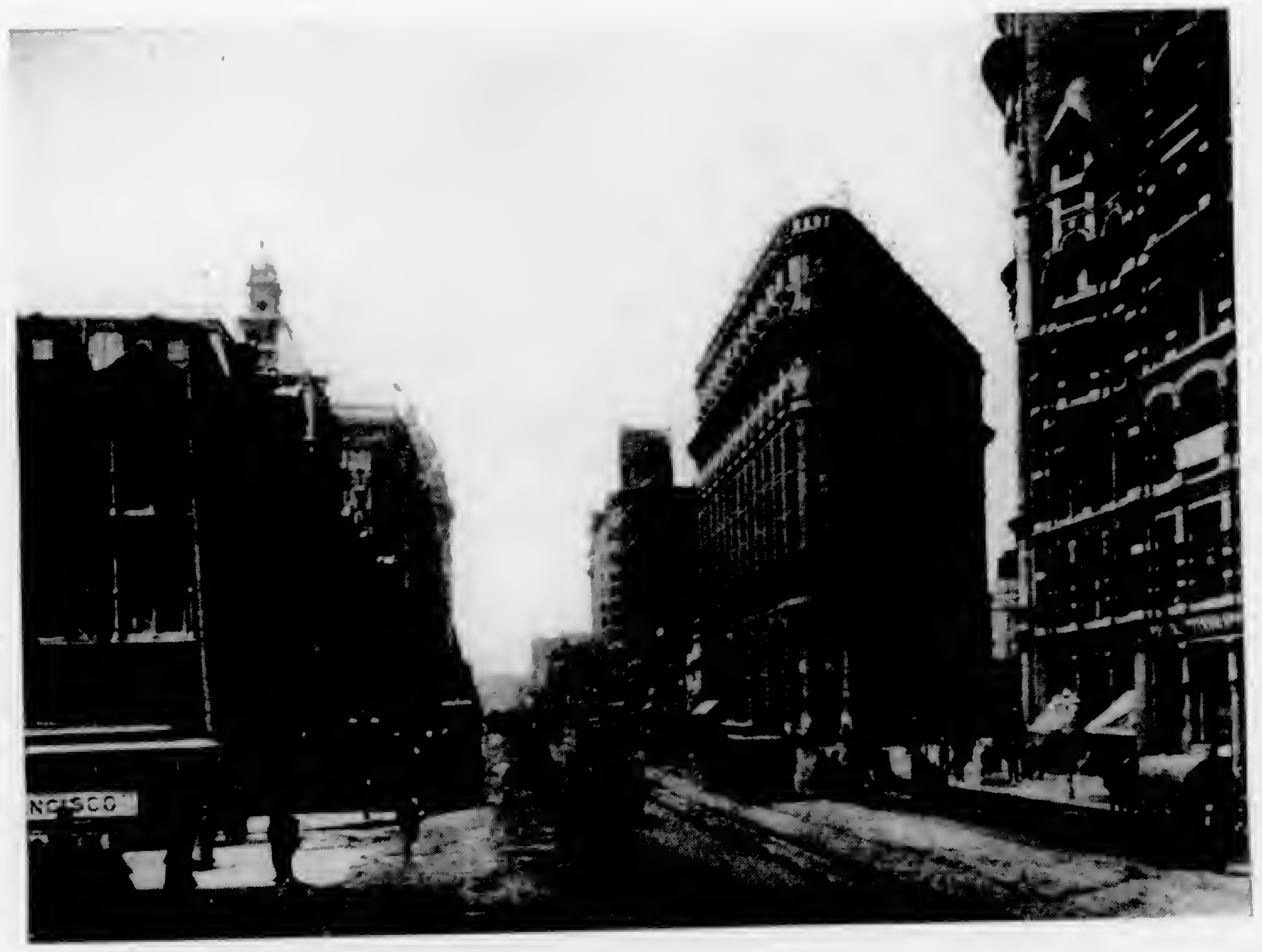
I quote John S. Hittell on the disposition of public lands which presented the greatest opportunity the city has ever had to make every reservation necessary for its park system and civic uses, and although the question was discussed and, even, a Park plan procured from the greatest of American landscape gardeners, Frederick Law Olmstead, the city council, to a great degree, may be said to have been remiss. It did make reservations, including the Golden Gate Park, which should probably mitigate one's final judgment. The criticism seems to lie against the fact that the council did not reach the possibilities of the occasion to make a city unparalleled in beauty, with boulevards, public places, parks and playgrounds, proper sites for museums, libraries and other utilities, which were well within its grasp. Mr. Hittell tells the interesting story thus:

"The title of the city to about four thousand acres of land west of Larkin street having been perfected, ordinances were passed to convey it to the parties in possession and to give them deeds for it. In 1853, the city as successor of the pueblo of Yerba Buena, presented its claims to the federal land commission for four square leagues, about seventeen thousand acres, under the Mexican law, giving so much for common or other public purposes to every pueblo or town. The claim was confirmed in 1854 by the land commission for about ten thousand acres, including all that part of the peninsula north of the Vallejo line, which started near the intersection of Fifth and Brannan streets and ran through the summit of Lone Mountain to the ocean. Both parties, the city on one side and the land agent of the federal government on the other, appealed from this decision, and in course of time the case reached the Federal Circuit Court, which on the eighteenth of May, 1865, filed a decree confirming the claim to the city to four square leagues above high water mark, 'for the benefit of the lot-holders under grants from the pueblo, town or city of San Francisco, or other competent authority, and as to any residue, in trust for the use and benefit of the inhabitants of the city.'

"An appeal was taken from this decision on behalf of the federal government to the United States Supreme Court; but on the eighth of March, 1866, congress passed an act confirming the decree, and granting to the city all the title of the United States to the tract described in the decision of the Circuit Court, with the exception of lands needed for federal reservations, subject to the conditions that all of this land not needed for public purposes, or not previously disposed of, should be conveyed to the persons in possession. The only opposition to the city claim recognized by the law was that by the United States; and when congress granted the federal title to San Francisco, there was no basis for litigation, so the United States Supreme Court dismissed the appeal, and the decree of the Circuit Court stood as the true basis of the title. That decision gave the land not already disposed of 'in trust for the use and benefit of the inhabitants of the city'; the act of congress gave it for the benefit of 'the parties in the bona fide actual possession thereof.' The inhabitants were many; the people in possession were few, but they had money, political influence, organization, and the legislature passed an act providing that everybody in possession of not more than one hundred and sixty acres, should keep it all. The supervisors passed the Clement ordinance recognizing the ownership of the people in possession, and the McCoppin ordinance, giving deeds to them. Thus a domain which might have been sold for millions of dollars, or given in small lots to ten thousand poor citizens, anxious to secure homes, was bestowed upon a few. The giving of such large areas was not in harmony with the town system of Mexico, and the possessory titles within the limits of the Pueblo claim were void under the American law; nor was their recognition consistent with sound public policy, but it received the sanction of the legislatures, councils and courts. The city out



Market Street at Montgomery 35 Years Ago, looking up Post Street C-383



The Same Locality To-day, looking up Market Street C-384 of all this vast domain reserved a park of one thousand acres, mostly drifting sand, and some lots for public squares and buildings."

Lafayette Park, for instance, was designated and delineated as a public square, and by legislative acts was irrevocably dedicated to such purpose. The land so selected had been in possession of its claimant as far back as 1855, before the Van Ness map was made. On December 17, 1864, he commenced an action in the 4th District Court against the City and County of San Francisco to quiet his title to certain designated portions of said square, and final judgment was rendered in his favor, December 25, 1867, the principle upon which the decision was based being that it was not within the powers of the commission, which prepared the Van Ness map, to set apart for public use more than one-twentieth of the land in possession of any one person, which was done in this case. The Supreme Court held that this judgment, while erroneous in point of law, was binding upon the city under the principle of res adjudicata, not having been appealed from. (76 Cal., p. 18, and 93 Cal., p. 251.)

The situation as to the Hospital lot, so called, now in part, Duboce Park, and Mission Plaza, now wholly in private ownership, is practically the same, legally, as that of Lafayette Square, similar judgments having been rendered in each case. (See Opinions of City and County Attorney Creswell, pp. 325, and 423.) In other words, the neglect of city attorneys in the earlier days lost to the city much valuable property. They failed to put in an appearance and allowed judgments to go by default.

Even the harbor of San Francisco was in 1861 awarded by a corrupt legislature to a private corporation to collect wharf tolls for fifty years, but the measure was vetoed by the then Governor Downey as Governor Purdy before him had prevented the extension of the wharf privileges then in private hands.

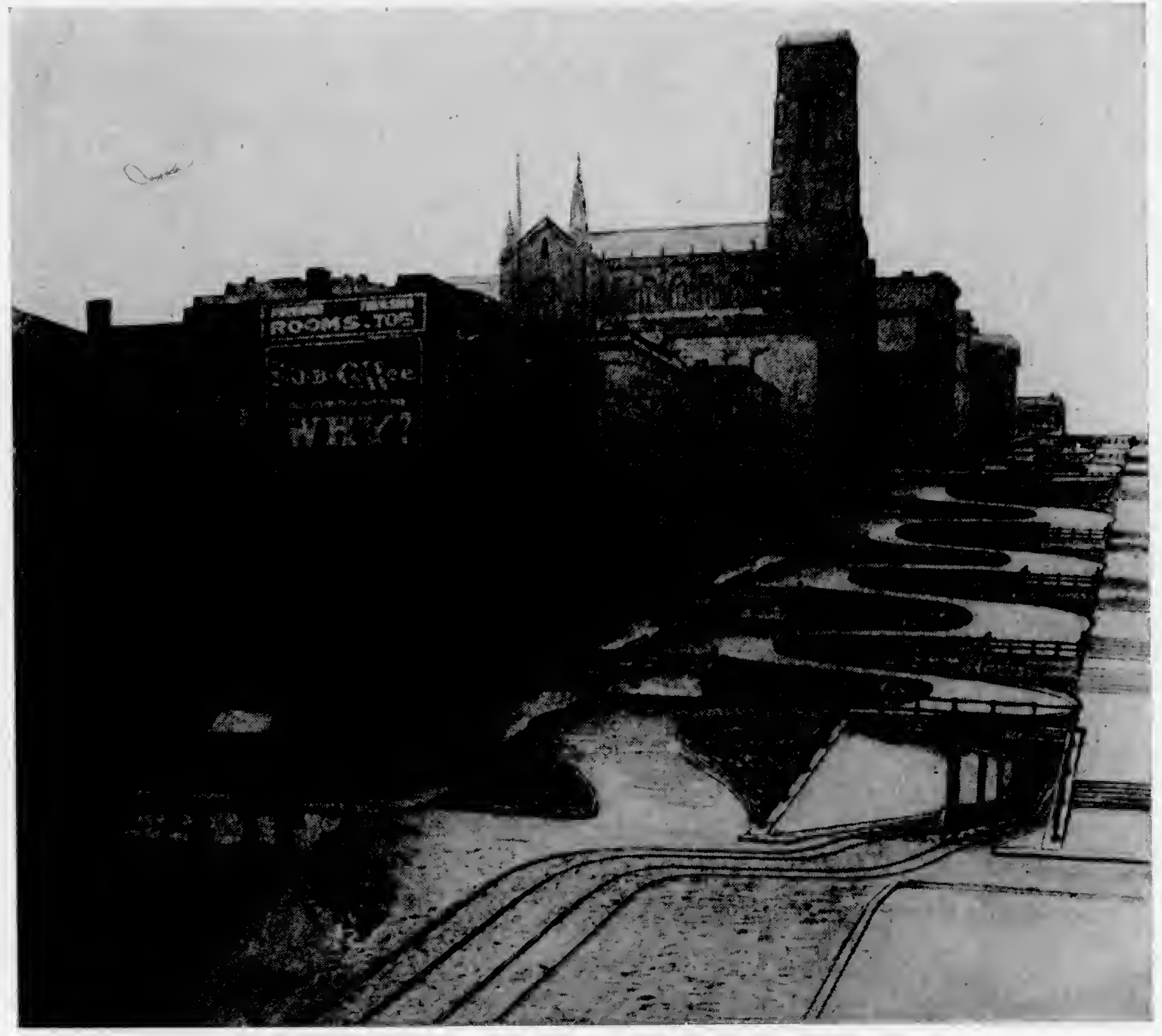
The "outside land" reservations referred to comprise 1,347.46 acres out of a total acreage of 8,400 distributed as follows:

Golden Gate Park	1,013.00 acres
Buena Vista Park	36.22 acres
Public Squares	35.46 acres
Other Reservations	21.25 acres
Cemetery	200.00 acres
91 School lots	30.13 acres
32 Engine lots	2.31 acres

The miscellaneous reservations were for lots for such purposes as the Academy of Sciences, Foundling Asylum, City Hall and Library, County Jail, Home for Inebriates, Home for Veteran Soldiers, Hospital and Ladies' Relief Society, all beyond Devisadero street west.

There was practically no dispute among the members of the Board of Supervisors as to the minor reservations, but the question of a greater or smaller park, its dimensions, direction and form, divided the board.

The majority of the outside lands committee favored a 1000-acre park which should unite the city and the ocean beach, but they opposed the extension eastward farther than Stanyan, and later Baker street (where the entrance now is), because in their opinion, the cemeteries to the north could "never be cut by a street" and the government reservation, they said, "obstructs traffic and the park, if extended citywards, would be a further obstruction to cross-town travel." They had no conception of a boulevard or park drive. It was either park or street in their view and hence the city lost the Panhandle extension at the time when it should have been made.

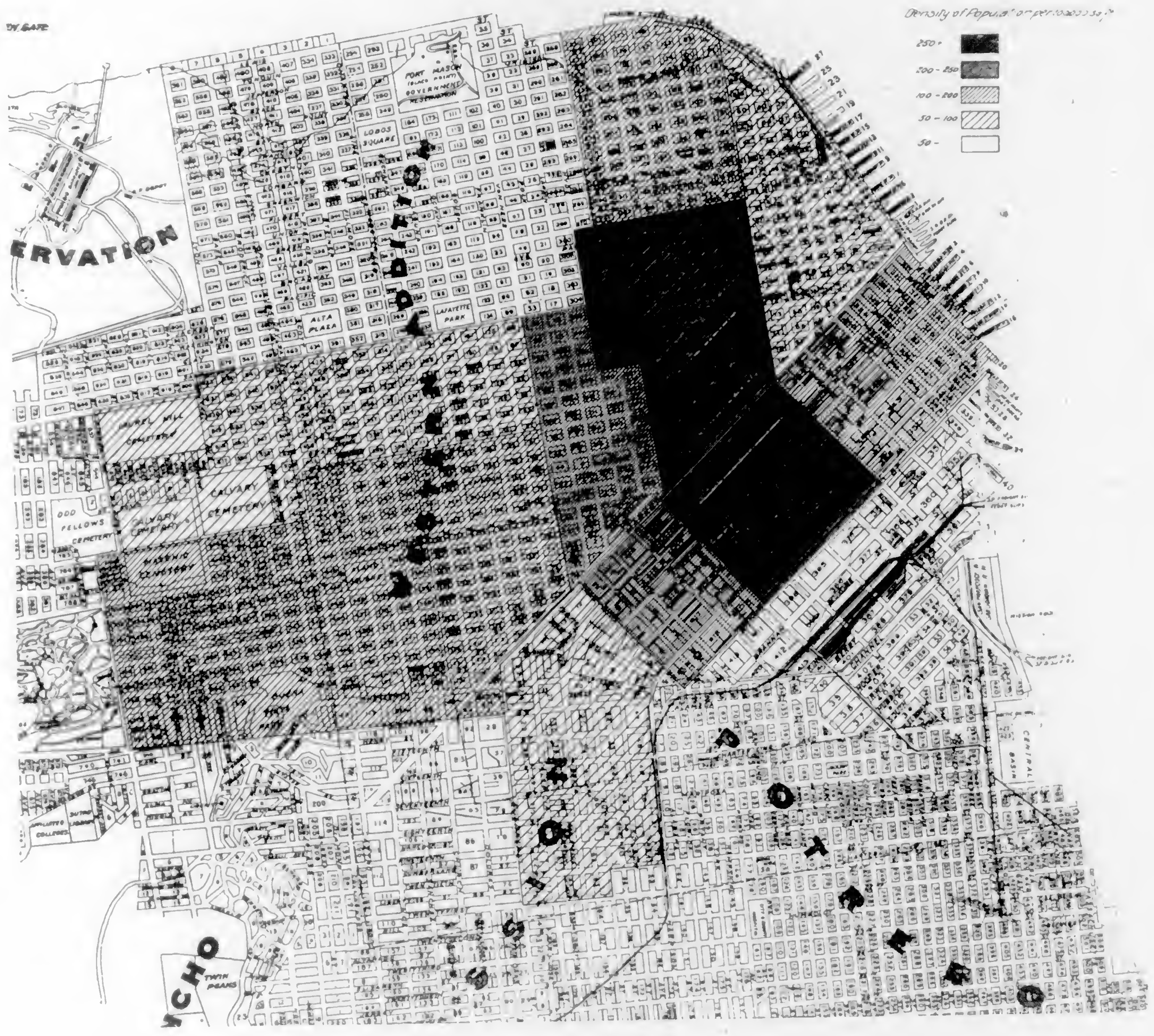


Proposed Terraced Roadway in California Street, with Tunnel for Cars C-385

The Board of Supervisors were importuned in vain by certain sagacious citizens to carry the great park down to Yerba Buena Park, where now stands the City Hall, but at a critical moment they lacked the necessary judgment and foresight. The press (see Bulletin of January 27, 1867) advocated a bell-shaped park comprising the ocean front on the west and extending like a "handle of the bell," by a broad avenue to Market and Larkin streets, where the city owned the Yerba Buena property.

Frederick Law Olmstead's report was before the board at this time, but, except as to landscape features, it seems to have been ignored. One committee refers to the "artificial way" proposed by him, meaning no doubt his treatment of Van Ness avenue, but it quotes approvingly from his report as follows, which is a justification for the Panhandle or Bell-handle extension of the park, citywards, in order to cultivate its convenient use and give it a worthy entrance—a park in truth stretching from the city to the sea: "The entrance to it (meaning any park) should be practicable and no great distance from that part of the town already built up; that it should extend in the direction in which the city is likely to advance or should be so arranged, that an agreeable extension can be readily made in that direction hereafter." (Municipal Reports 1867-68.)

What was Olmstead's plan? He did not possess the prevision of the future nor properly estimate the possible fertility of San Francisco's sandy soil, so he confined his recommendations to the region extending from the present German Hospital's lands, near Duboce Park, by way of Van Ness avenue to Fort Mason (Black Point). He parked Van Ness avenue and suggested a boulevard eastward on Eddy street as far as Market, and from Van Ness avenue and Eddy street diagonal avenues running to Yerba



Map Showing Comparative Densities of Population in San Francisco

C-386

Buena Park and to Duboce Park (now so called), and in the valley at this point he recommended extensive park grounds. Van Ness avenue was to be widened to a width of 390 feet and parked and the center sunken for the creation of a sheltered mall 20 feet deep with sloping sides, crossed by artistic bridges. This feature was no doubt suggested by the winds of summer and he had mistakenly satisfied himself that sheltering trees could not be made to grow, as in other places. In the light of subsequent development this part of his report possesses curious interest. He says: "It must, I believe, be acknowledged, that neither in beauty of green sward, nor in great umbrageous trees, do these special conditions of the topography, soil and climate of San Francisco allow us to hope that any pleasure ground it can acquire will ever compare in the most distant degree with those of New York or London. There is not a full grown tree of beautiful proportions near San Francisco nor have I seen any young trees that promised fairly, except, perhaps, of a certain compact, clumpy forms of evergreens, wholly wanting in grace and cheerfulness. It would not be wise nor safe to undertake to form a park upon any plan which assumed as a certainty that trees which would delight the eye can be made to grow near San Francisco by any advantages whatever which it might be proposed to offer them. It is perhaps true that the certainty of failure remains to be proved, that success is not entirely out of the question, and it may be urged that experiments on a small scale should be set on foot at once, to determine the question for the benefit of future generations; but, however this may be, it is unquestionably certain that the success of such experiments cannot safely be taken for granted in any general scheme that may, at this time, be offered for the improvement of the city."

He adds San Francisco could form a park "peculiar to itself," but, of course, unlike others elsewhere. All of Mr. Olmstead's suggestions were excellent, (excepting his misconception of the growth of trees in sandy soil and his sunken mall, predicated on this misconception) and if followed, as supplementary to the creation of Golden Gate Park, which he failed to suggest—a remarkable oversight—would have created and adorned an inner circle of drives—or perimeter of distribution—and, at a small expenditure of public funds, would have given to San Francisco the very improvements it craves for to-day—forty years later. The city has a great park—a possession to which he would have led the city ultimately—for he spoke of future expansion; but he dwelt particularly on the need of smaller parks, open spaces, parkways and ornamental avenues near the populous centers for the actual use and benefit of the people.

In spite of mistakes, unhappily made, San Francisco has grown, but it has grown on the original lines which had been laid down by the pioneers; the rectangular blocks on the hills have become fixed and difficult of modification; the great park, however, has developed into the finest pleasure ground in the world, due not only to its careful cultivation but to its superb termination on the shores of the Pacific; the Presidio government reservation has become really an auxiliary park containing 1500 acres of forested lands overlooking the Golden Gate, and the city, by the recent acquisition of seven blocks, has united the two great bodies of land. By the issuance of seventeen million dollars of bonds in 1905, the only outstanding municipal indebtedness, the city is now about to acquire the following utilities: Hospital, $1,000,000; Sewers, $7,200,000; Schools, $3,500,000; Street Pavements, $1,621,000; Jails, $697,000; Library, site and building, $1,647,000; Golden Gate Park and Presidio extension, $330,000; Children's play-grounds, $741,000; Mission Park, $293,000.

All the improvements contemplated by this bond issue will accommodate themselves to the new plan of the city.

The capacity of the city to borrow by the authorization of a bonded indebtedness, two-thirds of its citizens voting therefor, is fifteen per cent of the assessed value of all its property, which now (1906) is five hundred and twenty-four millions of dollars, which represents an increase of two hundred millions in the past decade. The limit of indebtedness therefore, is about eighty millions with a possible decennial expansion of thirty millions. The city's population is estimated at nearly 500,000. The commercial and industrial greatness which had been predicted for San Francisco from the earliest times has been fulfilled, and, as in older communities, a love of the true and the beautiful, a craving for artistic betterments and a sense of public duty have succeeded the hard struggle to tame the wild earth, explore its secrets, raze the forest, build the city and command the sea.

San Francisco gave itself in 1900 a new charter, by which responsibility is fixed, power given, home rule assured and a limit of one dollar is established for taxation, exclusive, however, of provisions necessary for park maintenance and the interest and sinking funds for bonds—in other words, no limit is imposed for public improvements, but every safeguard is exacted against operating extravagance. Under this charter the bonds have been issued and declared valid by the courts.

In 1904, Daniel H. Burnham was invited by the Association for the Improvement and Adornment of San Francisco to prepare a plan, and, in September, 1905, he, ably assisted by Edward H. Bennett, completed it, and it was accepted by Mayor Eugene E. Schmitz, after formal ceremonies of presentation by Vice-president Wm. Greer Harrison, at a special session of the Board of Supervisors, which gave it official recognition by ordering it printed as a municipal publication.

San Francisco, on account of its equable climate and its unparalleled natural advantages, located as it is, on bay and ocean, and seated upon many picturesque hills, is destined to be great not only commercially, but great artistically. Its peculiar metropolitan capacity to serve as a hospitable place of entertainment, yielding the most amount of comfort and of pleasure to its inhabitants, increasing their number and holding them by ties of interest and affection, has given it unique distinction.

In these latter years the city has wisely become conscious of its former self-neglect, and a strong sentiment pervades the community that improvement and adornment should be bravely begun, first, by the adoption of a comprehensive plan, which has just been accomplished, and then, by putting its recommendations into effect. That is the work which is now before the citizens of San Francisco.

What the people have needed is an ideal with which to nourish their imagination and to give them a goal towards which to labor with confidence. That they have in the Burnham plan.

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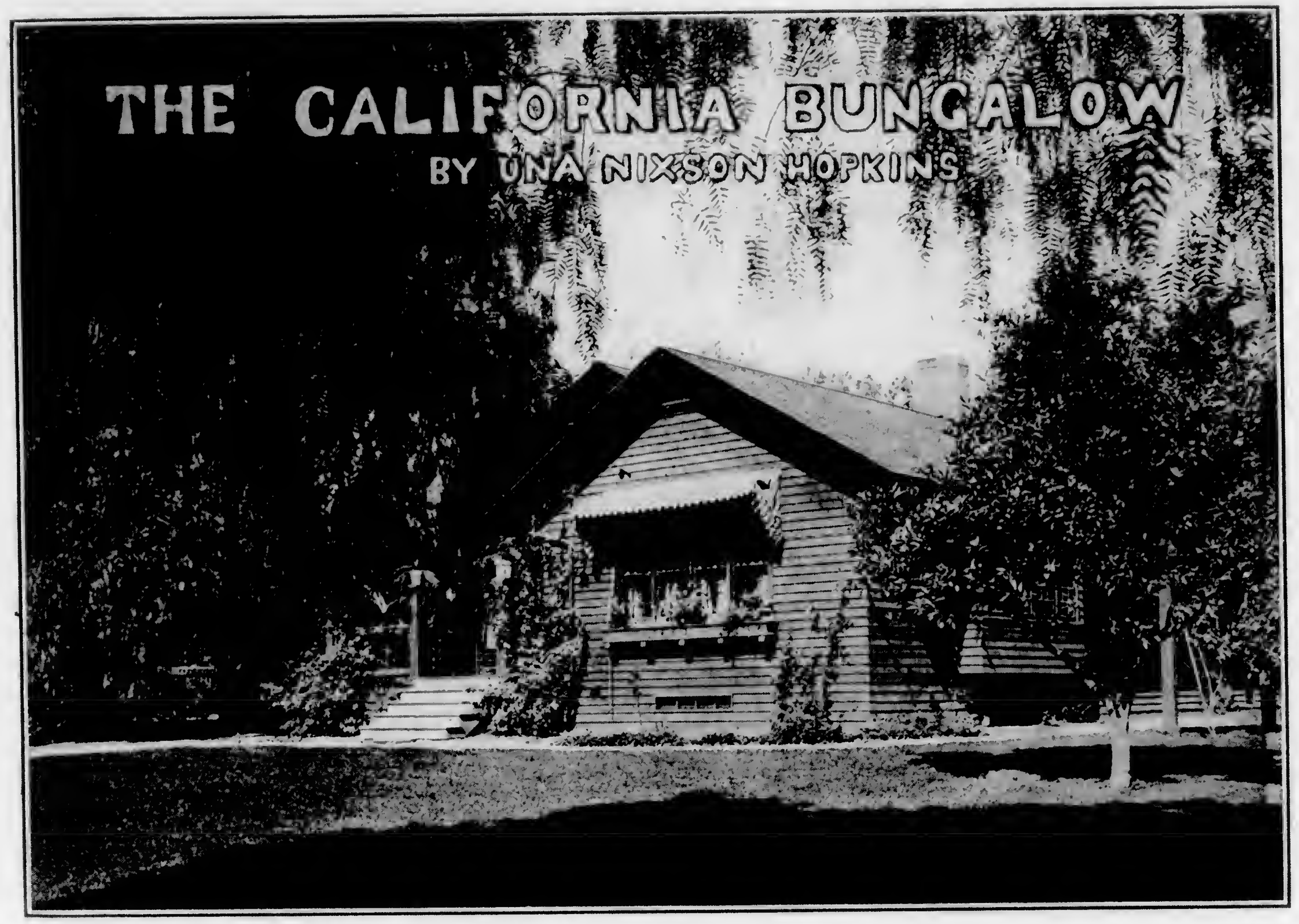
"My dear Jane," said the mistress of a household, "you have served us now faithfully for twenty-five years. We shall henceforth regard you as a member of our family. You will receive no wages!"



THE CALIFORNIA BUNGALOW

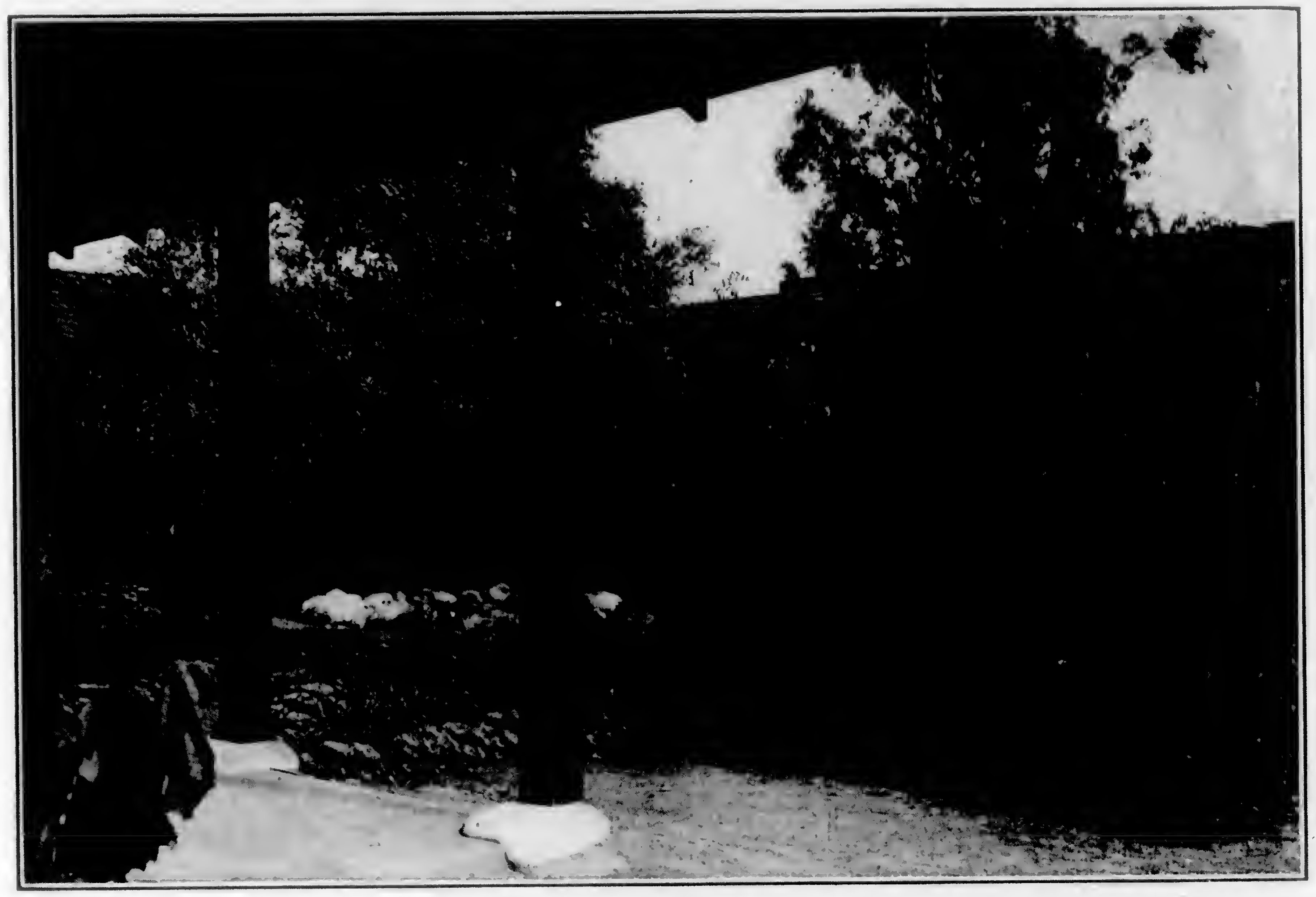
BY UNA NIXSON HOPKINS

Bungalow Home of the Author C-387

IN THE making of homes there is in America no truer expression of the individual taste and needs of the people than the bungalows of California. In fact, an art connoisseur of wide reputation who recently visited California waxed so enthusiastic that he declared it to be the most simple and beautiful type of the American home. Its evolution is interesting and its simplicity is responsible for its beauty. The same hypersensitive intellectuality that it takes to write a beautiful poem or to paint a beautiful picture, must be brought to bear in the making of a home if it would be beautiful. There must be a feeling for line, and, above all, for color. The very ground on which it grows needs be selected with forethought—the background of the home! Many things work together for the making of delightful small homes in California. There is the climate, allowing great possibilities, the material in vast variety, and, most of all, it is the mecca for artists, writers, thinkers,—for beauty-loving people, as is the south of Italy.

Artistic people are frequently not money-getting people. And these bungalow homes have not to do with money, speaking in the comparative sense. They have been thought out with the direct purpose of saving money. A beautiful home with the least possible expenditure has been the motto. To begin with, some independent soul bought an out-of-the-way plot of ground, built a low, rambling house in keeping with the location, made it in color to harmonize with the grass, the trees, the flowers—called it a bungalow, and lo! a new era of home-making was upon us. Others who loved the beautiful saw that there were possibilities outside of regulation lots and conventional houses, and they began thinking out the particular house suited to their needs, and of making it their own rather than copying their neighbor's.

The California bungalows stand for emancipation in home building. They have been designed with no previous custom in mind. Ground that in



"The Patio" of the Bungalow in the Arroyo Seco (Idah Meacham Strobridge) Los Angeles, California C-388

no wise would do for the ordinary house, as square as a dice and so high it threatens to topple, has been made a good setting for a house designed especially to suit it. Success in many instances tempted other would-be homemakers to try their originality in home-making, until California to-day is famous for her picturesque and original, as well as economical, homes.

This simple form of architecture has found favor with people, who, like the man on being asked what kind of a house he lived in, exclaimed laconically, "In a barn; but, thank Heaven, I know my own front door." The marked originality of these bungalow homes is due to the fact that they have in every instance been designed for individual tastes and needs. There is no postage-stamp repetition about them. They vary in size, character, and general construction, as they vary in location, being ubiquitous along the Pacific Coast, from San Diego to San Francisco, and even farther north. A delightful cosmopolitanism prevails about them—for while traditions for the most part have been left behind by the wayfaring Californian of to-day, yet, unconsciously or subconsciously, there creeps into this unconventional western home a suggestion of the elements in a home he has loved best elsewhere. Undoubtedly the native Californian has been more influenced by the Spanish adobe than any other form of architecture, though the days of adobe are past, unfortunately, for picturesque house-buildings, and fortunately for hygienic and practical reasons. But the early Spaniards and Mexicans instinctively had a feeling for good lines as people who live near to nature and are not hampered by other people's ideas usually have. There was no ornament, useless or otherwise, about their houses, and these are the watchwords of the good present-day small house. Here is one of the cardinal points in which it differs from the cottage. The cottage, generally speaking, makes pretensions—it sets up airs in keeping with larger and more elegant places of residence. Then, too, the number of rooms in a cottage is

entirely out of proportion with its area. There is the hall with fussy hat-racks,—the parlor, if you please, often furnished in white and gold—the keynote of Louis XVI. drawing-rooms, and a dining-room that opens from this parlor, as if you would put together two pine boxes and then cut a hole between them. Nor would it be in keeping with the canons laid down for these houses to let so much as a mite of real construction show. And if, perchance, a half-dozen people by any prearrangement or mere coincidence happen to appear at one of these houses at the same time, each and every one must have the feeling that he is a human sardine being packed in a box, alive.

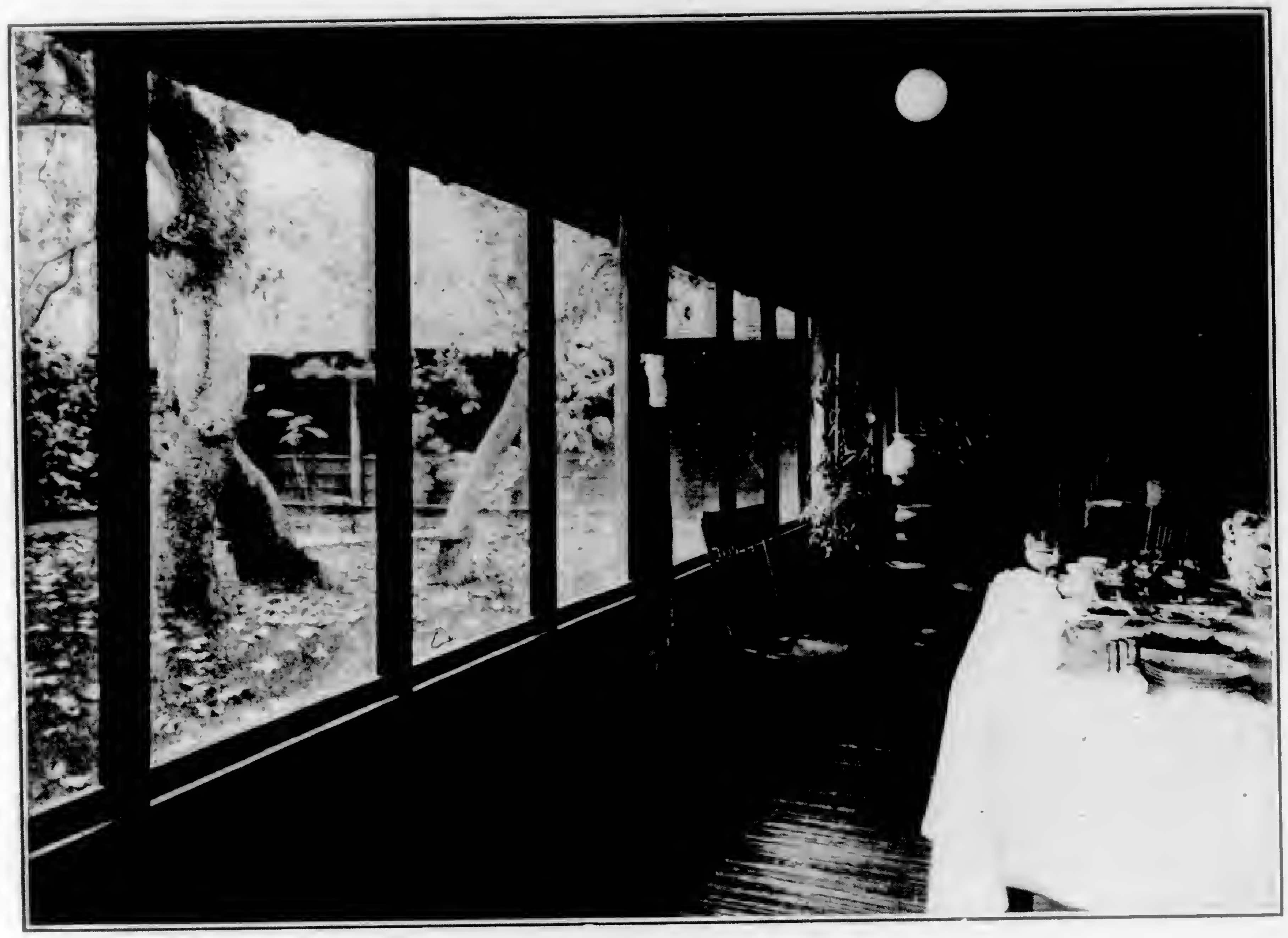
All cottages are not bad any more than all bungalows are good; however, the one is the antithesis of the other. The bungalow decries ornament, and at least is free from pretensions. Its claims to beauty rest not only on its simplicity, but on its adaptability to its environment, its careful proportions, good lines, and its outdoor features, as well as its real construction, which is usually in evidence.

The illustration of "A Bungalow in the Arroyo Seco" pictures one of the most perfect of these Southland homes—a veritable chef-d'oeuvre. There are two hundred and fifty running feet of wide porches, screened in, where the family live, besides a patio, around which the house is built. There is a long veranda on the front, which is cool in summer with the breeze from the sea; another divides the house in twain, and there is still another running the length of the house on the patio side. Here, if you are so fortunate as to be asked to dine, you may listen to birds and to the falling leaves of the sycamore trees, as white in the light as the cloth on the board. There are wide couches, palms, easy chairs, comfort, beauty, everywhere. The woman who planned its every detail will open the front door to you if you should knock there. She has not slept in the house for years, and she can tell you of the real joy of living in California. There are homes which we all know, costing thousands, that do not approximate this one in point of real beauty—"A low roof with green trees half-concealed," it has, soft brown color and, most of all, an air of home. No one ever built one just like it before—it is individual in every particular.

Many of these bungalow houses are simply boarded up inside and out and battened, and with few exceptions the front door opens into the living room, which is very large, being living room, reception room, library, and den in one, and frequently one end of these large rooms is used for dining-room, a screen or heavy curtain dividing it from the main part, making it as exclusive as need be. To be sure, a dining-room is more desirable, but where the money is not sufficient to build other than a small house, one splendid room is preferable to two small ones, both from the point of effectiveness and as comfort.

The kitchen and pantry arrangements of these houses are planned to save work, and the sleeping rooms are sufficient for the family use—there is seldom especial provision for guests.

One or two of the illustrations show houses which were designed wrong-side out—with the studding on the inside and between these the plaster, the lathing having been done on the outside, and rough boards nailed over. The joists show overhead, and everywhere the construction is evident. The living room is of goodly proportion, being long and narrow, with one end used for a dining-room. You enter through an old-fashioned Dutch door, the author of this house having had a penchant for this sort of door "back East." The front door of nearly all of these houses receives particular consideration—being large, and designed with special regard to the hospitality they open to you. The fireplace in this room is a huge one of clinker brick. This brick has found favor with a vast majority of bungalow builders. It is rustic in effect, excellent in color, and lends itself to both exteriors and interiors. The



Screen Veranda, where the family dine throughout the year, showing a corner of patio and bungalow. Idah Meacham Strobridge C-389

windows in this room are so many as to make one imagine he is looking through a spider's eye, and have small panes and casements that swing out. The windows of the small house are of most importance—the bungalow here takes issue with the cottage. The bungalow is never guilty of plate glass, an item to be set down in its favor. Cottages have a liking for picture windows, which are apt to make a small house look like a little bug with big eyes.

The boarded-up bungalow, of which there is a picture, belongs to the scion of one of California's oldest and best-known Spanish families. Its location is superb—among the oaks, with a panoramic view of the mountains extending for miles around. The patio is in front, where flowers bloom perennially. French doors open into this countyard from every room that is in sense a living room, even the bedrooms. The house rambles to suit its will, and there is plenty of ground, so that the wings of the house do not elbow each other. There never was seen a more splendid fireplace in any house of its kind. It is of cobblestone, in the center of the long side of an immense room, with big stones at the bottom, gradually growing smaller towards the top, with one huge stone on the hearth for a seat. There is about the bungalow the old-time simplicity of the adobe, an aroma of hospitality and romance that must have been wafted from the ancestral home, set as this is in God's green acre.

There are so many ways of making these houses. Rough boards—the rougher the better—put on lengthwise, are rustic enough in appearance to pass muster in the ranks where surfaced materials are prohibited. Plaster is not tabooed entirely, though it must be rough, and used in connection with plenty of wood, but wall paper is not quite appropriate. Burlap, however, both natural and colored, is looked upon with favor, and rightly, for its rough surface makes a pleasing combination with rustic effects. Canvas, too, is very good, and there is one little bungalow, hidden away under the branches of a live oak tree where khaki has been used above a wainscot of pine, stained brown; it curtains a door that leads to a stairway and hangs at French windows, opening upon a hillside. This soft, tan-brown comes in line with the green outside, and no one would guess its real texture.

Bungalow of Arturo Bandini. A beautiful bungalow that is boarded up and down, inside and out, with a patio in front C-390

The California redwood is a boon to builders of houses where every man wishes to make his house his own. It has more possibilities than any wood obtainable, since it takes so many different stains with so many different results. If left natural with white lead rubbed into its surface, it retains the fresh pinkish color that it shows when first sawed, combining beautifully with green in the same scale of color. Where a dark effect is desired, a little green used with a mahogany stain gives it the most wonderful coppery look. Even the outside creosote stains may be used on the redwood; in fact, there is no end to the ways of treating it. Shasta pine is the best wood to stain brown or green; in brown, especially, it allows a range of shades, from the natural color to the almost black of the English oak. There are burned effects to be gotten, and various ways of treating the wood with chemicals, resulting in some good tones of gray, all suitable to the interior finish of the houses under discussion. These experiments in house stains are interesting in the extreme to the person who has a little of leisure and is responsive to color.

The furnishing of these homes is much more difficult than one might suppose, for the simplicity and rusticity of the bungalow puts rather careful

East End of the Living-Room C-391

Dining-Room End of the Large Living-Room C-392

restrictions on its furnishings. The coloring, to begin with, must be strong, never with any suggestion of daintiness, for color alone may give a feeling of weakness or of strength. The colors of the woods are best suited to them—greens, browns and the dark, dull reds of autumn. And if blues ever creep in, they must be in small proportion and used with another color. The blue of the eucalyptus combined with its green, for instance, illustrates the meaning.

When it comes to the actual furniture, the so-called Mission style, which varies in design, as do the houses, is for the most part quite appropriate. It may be stained to match the wood, and many a man who has built his own house has been able to construct his furniture as well from these models, patience being the main tool used in its making, along with careful measurements and well-seasoned wood. Collectors of Indian baskets, curios and rugs have found a fitting background for their collections in these houses built with head and hand. The bright blankets, which are too strong in color to suit the ordinary cut-and-dried house, are admirable on the floor of a rustic bungalow, and Indian baskets make a frieze that is not only interesting, but beautiful in color against a dark-beamed ceiling. These, along with the pottery used for wild flowers, will make a surprisingly good room. Quaint things from Mexico you find if you peep into a few fortunate homes, though they are infrequently found, as few are fortunate in possessing these treasures, since the people in the part of the world from whence they come do not so often part with their treasures, as we transitory, money-loving Americanos. Old furniture that has seen passage on high seas, and been held captive about the Horn, has found its way into California in surprising quantities. "Bungalites" have been keen after it for years, and if one should judge from appearances, it finds a congenial home in the California bungalow.

The inadequacy of suitable floor covering for rustic houses is responsible for the revival of an old industry—that of weaving rags into rugs. A few years ago one could no more find a weaving establishment than one could find bricks of gold in the streets—now it is surprising, not only the number of places where rugs are made, but the beauty of the rugs as well. They are made of either wool or cotton, and usually some of the material has been dipped in the dye-pot in order to create the right coloring. When one considers the actual rugs permissible, the list is short. Those made of grass will do, and Oriental rugs, which are good anywhere under the sun, are perfectly suitable, providing they are not new and garish. The floor coverings popular for Colonial cottages are not suitable for the bungalow, and they constitute one of the problems of furnishing.

Even hardware and fixtures must have their own individuality and belong to this or that house, and can never be bought at random at the shop. They had better be congenial spirits with the light fixtures—made by the blacksmith or metal worker, as they frequently are, and in one house where hand-wrought things were not to be thought of, common japanned hardware was bought and soaked in lye, taking off the paint, and, after weathering, as it were, they had the appearance of something hand made.

So that when the California bungalows are noted collectively, individually and carefully, it will be seen that they are not stereotyped homes, but have been studied out as a whole from the standpoint of general effect, and then as to the nicety of detail. Some of the prettiest of them are so inexpensive as to be called, by their modest owners, shacks. Taste has been substituted for money. Money alone can no more make a beautiful home than taste alone can rear a palace. Even the very flowers that grow about their doors have been planted with a purpose. They do not bloom in a riot of color that offends the sensitive eye, but have been selected with a care as regards the proximity of their various colors. You will not see the gorgeous bougainvillea planted next a flaming red geranium any more than you will see one of these well-considered houses stained a green that declares war with the green of the grass about it. Stain is used rather than paint, always for the exteriors, unless a little is admitted in the trim about the windows, shiny surfaces being held in light regard.

There are those overburdened with conscience, out of all proportion with the subject, who question the adoption by California of the Anglo-Indian word, bungalow, because they are not exactly like the Indian bungalows. The California bungalows vary in many essentials from the mother bungalows of India, but the term is worthy of expansion, and seems best suited to our one-story, rambling and most original of dwellings, in no wise cottages, which are better described by this word than any other.

An astonishing amount of artistic ability has been called forth in the making of these homes, and the California bungalow affords to many not only a beautiful and dignified home, but illustrates the possibilities of results when heart and head and hand work together for good.

EDITOR'S NOTE.—Reprinted from "The Pacific Monthly" by special permission of the publishers.

* * *

Surprised His Wife

A STORY is told of a Pennsylvania farmer who wore his old suit until every one was tired of it, and his estimable wife was almost ashamed of the hustling man who had been inside it so long. But one day he went to town to sell his produce, and while there he determined to buy a new suit and—happy thought—surprise Eliza. So he bundled a new suit into the wagon and drove homeward.

It was after night as he hurried homeward, and at a bridge over a river he stood up on the wagon and "peeled" and threw the despised old suit into the river. Then he reached for his new clothes. They were gone—had jolted out of the wagon. The night was cold and his teeth chattered as he hurried home. But he sure did surprise Eliza.

Competitive Design for Tourist Hotel at Claremont Park, Berkeley William Knowles, Architect C-393

Heraclee

THE Boston Transcript translates the following article by M. Joseph Galtier which appeared recently in Le Temps: "I have lately heard talk of a scheme that seems to me genuinely noteworthy. Certain well-known Parisian artists, painters, architects and men of letters are about to found a city. Apparently they are actuated less by the rare pleasure of founding something than they are by the conscious need of escaping the excitement and promiscuity of the great centers of modern life. They dream of a quiet nook to which they can go to find shelter from the exactions and vulgarities of the social hurly-burly. They want to found their city as carefully as they would found a club. They want to make it a close corporation. Nobody will be allowed to live in it unless he has a clear title to citizenship in the Republic of Letters and Arts.

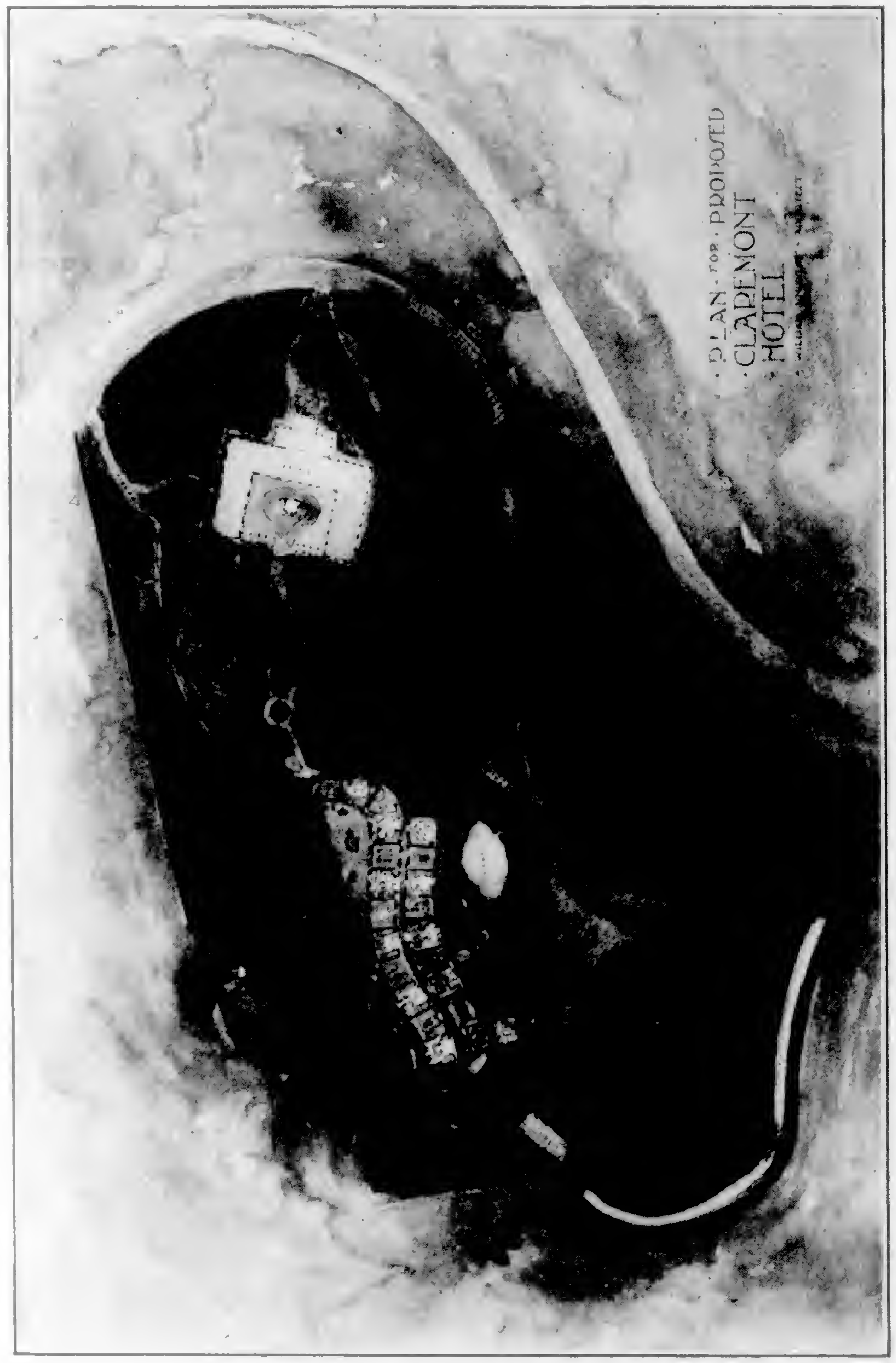
"The idea is certainly attractive, nor is there anything especially surprising about it. What more natural than that victims of our decrepit civilization should look back wistfully to the days when youthful tribes ceased their wandering at pleasure to fix their dwelling in a land of their choice? What more alluring than to quit the smoky, horizonless metropolis and enter the land of sunshine and there—with one's own hands, so to speak—to build an ideal home in a city peopled only by one's chosen friends? For these impassioned builders all have the same tastes, the same aspirations.

"They're as madly in love with their future city, I imagine, as Horace was with his villa. They make it the symbol of their independence and the guaranty of their repose. No one will work in the future city, say they. It will be purely a city of rest. Its people will never be disturbed by anxiety for the future. They will bask in the present like shrewd epicureans and evoke from the past its most endearing memories. With no ambition save that of tasting the sweets of existence with artistic delight, time will pass altogether deliciously. And time will be infinitely valuable, for nobody will think of setting a price upon it and declaring it to be 'money.' Time will be loved for its own sake only.

"We shall have fled far, indeed, from the current ideas of living. We shall have returned to the olden ages that knew nothing whatever of the complicated machinery that stamps human existence with incessant trepidation and an ever increasing feverishness. Our founders don't intend to put all the resources of recent inventions at the service of their enterprise. Their city won't be the last word on scientific perfection. It won't in the least resemble a roaring Anglo-Saxon town.. Rudyard Kipling will never chant its charms. Its serene graces would be better celebrated by a John Ruskin, who would admire this return to simplicity, quietude and the worship of nature.

"The site of the future city has already been chosen, and attests the aesthetic taste of those who—to-morrow, perhaps—will be its first inhabitants. Like all famous cities—those mothers of civilization—the city will rise in the basin of the Mediterranean. By the shore of that sounding sea which cradles the childhood dreams of our race, upon a site that possesses the harmonious lines of Greece and the luxuriant verdure of the Orient, and at the head of a gulf with shores drawn gracefully in broad curves like those of the acanthus leaf—there you will one day find the new city. It will rest upon French soil. The chosen spot lies hidden away on the Cote d'Azur in a nook quite remote from the regions pre-empted by fashion. It is just behind the islands of Hyeres. M. Sardou already owns a hillside holding there.

"Properly speaking, the location has not been discovered; it has been rediscovered Our ancestors knew it well and valued it so highly that they built a city there and named it Heraclee. The new Heraclee will accordingly replace



Plan for Proposed Hotel at Claremont Park, Berkeley
William Knowles, Architect
C-394

the ancient one. Still upborn, it boasts a high and noble lineage, and it will link its future to an illustrious past. Heraclee de Gaule flourished during the twelfth and thirteenth centuries of our era, and had many lovely villas belonging to merchants from Marseilles and wealthy Ligurians.

"Our artists are pleased to place the resuscitated city under the protection of Hercules—just as it was in the olden times. They doubtless expect that their propitiatory worship will yield them a sound and sane repose, for they don't attribute too precise a significance to this idea of patronage or seek to make a dozen illustrious works the prerequisite for admission. That would be altogether too aristocratic a conception. And yet one foresees that upstarts won't find it easy to enter the promised land. Heraclee will be a place for those upon whom Fortune has deigned to smile. Only proud mortals with handsome incomes will stroll its streets. Heraclee will be an object-lesson full of encouragement for future generations.

"Will Heraclee ever exist? Will the project whose charms I have just exhibited ever be realized? Is it anything more than a poetic dream? I hastened to hunt down all the Heracleans I could hear of, and when I caught up with the first of them—a man still young and vigorous—he showed me two large photographs that lay on the sofa in his study.

"'Here are two views of the chosen spot. You see we are not merely building air castles. It's a lovely place! The valley is rich in tall palms, while the hills—as elegantly outlined as the Tuscan mountains—are covered with pines. The sea forms a bay with magnificent curves, and the Manres Mountains shelter the whole region from the awful blasts of the mistral. It's a wonder it's been left uninhabited. The glitter of fashion has never visited it. It's almost like a little island. The thought of one day going to live there is a sure cure for ennui, and the sight of that exquisite bay, where I can already see my cottage, consoles me for the rains and fogs of Paris. Even now I take refuge in Heraclee in my leisure moments. I could wish that I might have nothing but leisure moments.

"'The supreme charm of Heraclee is the centainty that tasteless houses won't be tolerated there, or sumptuous villas or pretence of any sort. Every new building must first be approved by the "citizens," and they'll see to it that the site isn't dishonored. Besides, M. Nenot, the celebrated architect, has already made us some drawings, and he will be regularly consulted so as to check the caprices of property-holders.'

"I took pains to call upon this M. Nenot, who was so thoroughly qualified, according to the Heraclean, to tell me about Heraclee. The architect of the Sorbonne, who perfectly understands the value of proportions, has reduced those of the famous scheme to their just measure.

"'It is true that we want to found a sort of colony—a group of villas for a corterie of friends—on the Cote d'Azur, behind the islands of Hyrere. For my own part, I could wish that we might remain a little colony all by ourselves. Don't speak of such a thing as a wholesale invasion. Nothing could be more unfortunate than that!

"'The thing we must especially avoid at Heraclee is architecture. We want no columns, no pediments, no lintels. I recommend very simple houses, in the antique style, in keeping with the landscape and the climate. I forbid the Norman, which is wholly out of place on those sunny shores. I should be pleased by the adoption of the picturesque and comfortable rustic houses of Capri or of the little Greek cities; white walls with well-placed window-openings and no balconies; terraces, as in the Orient, before the entrance, and a pergola in the Italian style. The rooms should be spacious, not too high, and with a friendly look of hominess. The walls should be thick, so as to temper the rigor of the seasons. Finally the houses should be homogeneous. I have drawn the plans for my own house and that of a friend of mine.

"'I don't want telephones or electricity. The railroad is about two miles and a half away; I hope it will stay there. We shall not be tempted to hurry at Heraclee. We shall live for the sake of living.

"'I shall spend by declining years there, and there I shall lay me down to die. Like the old men in "Faust," we shall watch the ships sail past; but, happier than they, as we gaze upon the all but Grecian blue of the sea, we shall fancy that now and then we're catching sight of Ulysses's white sails.

"'At present the surroundings of Heraclee are an unbroken desert; you may walk twenty miles along the beaches without meeting a living soul. The whole district is abandoned, and you would never imagine that a city flourished there in the twelfth century. And yet it was a favorite watering-place, like Baise, in the days of the Empire, and land was then as dear as in the Boulevard des Italiens, costing 4,000 francs a metre.

"'On the site of my future house are the remains of a Roman villa. I intend to excavate them. As for that, a good gentleman from Lyons has got ahead of me; he touched off a dynamite cartridge under the soil and the explosion strewed the surface with coins and medals. He made presents of them to all his friends—except me!

"'The land is rich in memories; also in fertility. The varied vegetation proves that conclusively.

"'Now, you see, we've nothing to do but build our villas. The city will come later. I shall make my plans for it on the spot, and in the sunshine of that lovely shore. Like the villas, the city will be of the Midi style of architecture—without ornament. Everything will be sacrificed to comfort and simplicity. The streets and avenues will avoid the right-angle regularity of modern thoroughfares and their graceful curves will be a delight to the eye.'

"Rejecting the gifts of civilization, the Heracleans will return to the primitive life of peoples more artistic than scientific. A city without railroads, without electricity, without telephones and without automobiles will be so absolutely exceptional that—if ever it is built—the whole world will want to visit it. Our artists will no longer have it all to themselves. Will they raise an army to defend their gates? In our day the founding of a city involves numberless unforeseen difficulties. And I may add that the project encounters a lot of scepticism. A clever friend of mine, to whom I had described it, exclaimed: 'A city!—a city of artists!—and probably a city of old artists! But such folks can't keep peace among themselves for the space of a good dinner!'"

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Relative Cost of Brick and Frame Structures

THE subject of comparative cost of erecting the walls of dwellings of brick and of lumber has developed no little discussion in the past and the topic coming up in course of conversation with a builder who was engaged in erecting a brick structure, he was asked his opinion as to the cost of the two forms of construction. He replied that he had figured it out very carefully before deciding what material he would use in the construction of the building upon which he was then at work and his figures showed that the cost for lumber to frame his walls, sheathing, building paper, weather boarding, etc., and the lath on the inside footed up more than it would cost for brick to build the same walls. After the walls were erected, however, he found it cost more to put up the walls than it would to have employed carpenters and erected frame walls, the difference in the cost of doing the work wiping out the saving in the cost of material by using brick. This, it might be remarked, was in a clay section of the country, where brick are produced at a very low figure.

Terra Cotta and Brick

Different Kinds of Brick

By W. E. DENNISON, President Steiger Terra Cotta Works

BRICKS have had so much to do with permanently marking the promontories that carry the beacon lights of history, their very name has become a synonym of strength, endurance, security and confidence. They have proclaimed these attributes to the music of the trowel through all the ages and to so many different races as to suggest their classification, not according to shape or composition, but with reference to their language.

Even as no man's education is considered complete without some mastery of the tongues no longer spoken, so to-day few buildings designed for permanent use and enjoyment are constructed without the main protection afforded by the classic common brick. Tenacious as the early geographers were in their belief that the earth was flat, bounded by a limitless ocean, and the eloquent African astronomer in his dictum that "the sun do move," so we moderns are confirmed in the belief that the car of progress was never more impressively paraded than by us. We seldom now allow the classic common brick to be seen in our best structures. Even as the literature of to-day banks the somber tones of Homer and Herodotus behind the brilliant covers of Ben Hur and The Light of Asia do we hide the common brick with creations such as are illustrated in this and the January number of Terra Cotta Topics.

And this brings us to consideration of the bricks which record more and more perfectly the architectural thoughts of to-day. More than this, they speak a various language. To the clay worker they bring with impressive introduction the genius of modern invention and forever relegate to the dust of oblivion the wooden moulds of Pharoah's workmen.

The term **Pressed Brick** is used to distinguish all clay bricks used for the facing and finishing of the building from the common bricks used for the backing. They may be either plain square or moulded shapes. They are made by two processes, one known as the mud and the other the semi-dry process. Whether the manufacturer employs one or the other process, he must observe the same rules to a certain point, which are as follows: The clays must be dug and stored under cover in open sheds from one to two years before use if the best results are to be obtained. They thus go through the weathering process. They are then blended with sand and other materials in proportions varying according to the color and texture of brick to be made and ground in a dry pan or other mill suitable for thorough pulverization. The dry pan is circular, about nine feet in diameter and one foot deep. Its bottom consists of an outer band of slotted steel screens surrounding an inner circle of solid steel plates upon which roll two large steel-rimmed wheels or mullers supported on arms extending from a shaft standing upright in the center of the pan. This shaft engages driving gears at the top, causing it to revolve and drive the mullers rapidly around the inner circle of the pan, thus crushing the materials thrown into the pan. As soon as the material is of the requisite fineness it drops through the screens into a hollow space, called the "boot," under the pan, whence it is picked up by a bucket elevator and carried to overhead bins and there held until needed.

At this point the methods of the mud and semi-dry process diverge. We will follow the mud process first. The pulverized clay from the storage bin is dropped through a chute into a large mixer which can best be described by likening it to a giant sausage machine. An attendant allows a jet of water to pour into the machine and mix with the clay which is violently agitated by steel knives placed propeller-blade fashion on a horizontally revolving shaft. The clay properly tempered is forced out through a die on the end of the machine in a square column and is carried along a table composed of wooden rollers closely placed together. A few feet from the discharge end of the auger machine is placed the cutting table which is a frame carrying tightly strung piano-steel wires so spaced that when the frame is made to descend suddenly by hand power or automatically by steam power the wires pass through the clay column cutting it into brick dimensions. These green bricks are placed on wooden pallets and stacked up to dry for a day or two, according to the temper of the material, for the purpose of so stiffening the bricks that when they are placed in the power-driven machine known as the re-press, there will be no tendency for the clay to squash out of the steel moulds when the heavy pressure is applied. In the re-press the mud brick manufacturer gives his brick its final shape, finish and whatever impress he desires. From the re-press he must again remove his brick on pallets and stack them up to dry until ready for the kiln.

In the semi-dry process the pulverized clay is conveyed automatically to a steaming chamber where it passes over screens accomplishing minute separation and a slight accumulation of moisture. Thence it falls through a chute to an automatic press of such heavy construction and compounded leverage as to deliver a pressure of over 25 tons to each brick. The material, if taken from the chute as it is being delivered to the moulds of this press looks like meal and the moisture in it is scarcely perceptible, yet when it is thrust onto the delivery table of the press as a finished brick its density is such as to give to the face of the brick a lustre of glass. The bricks thus made have such a minimum amount of moisture that they do not have to be taken to a dry room to be cured, but are borne on spring-bearing trucks directly to the kiln and set ready for the firing.

In the modern art of brick making where cheapness, perfection and the maximum output are desired either one or the other of these processes is employed. Hand-made bricks are but a memory in this country, than which no country in the world to-day can show greater advancement. All common brick are made by the mud process. There are two kinds, called the "soft" and "stiff," the former using more water than the latter. A few of the manufacturers of face or ornamental pressed brick still cling to the stiff mud process, but a large majority, we believe, use the semi-dry process because of its obvious advantages.

If the reader would become more familiar with this modern art whose epoch has not yet seen more than thirty years of life and is destined to leave a greater impress upon the world's architecture than the combined efforts of all the clay workers from the time of Asychius down to the centennial of America, let him visit a first-class brick plant operating the semi-dry process and see the range of colors produced by fire in its action on the various blends of California clays. He will see a few of the first letters of that myriad alphabet of colors which spells the doom of every brick relying upon any mordant other than fire to fix its particular shade.

As the physicist looks through his glass prism at a beam of light produced by a color and the prism separates or spreads out in order, according to their refrangibility, all of the different colors of which the beam is composed, so the scientific clay-worker of to-day is able to see the spectra of his clays through the scope of his kiln fires and to produce any color of brick that the architect may desire.

* * *

Hollow Terra Cotta for Country Buildings

By GEORGE E. WALSH, in Carpentry and Building

BUILDING laws of our cities demand more or less fire proof construction of houses, so that the use of brick, terra cotta, concrete and steel skeleton frame work have become the chief materials for architects and builders; but in the country frame houses of wood are not only permissible, but the most popular. Nevertheless, owing to the great fire losses and high insurance rates, the tendency to build with fire proof materials is rapidly growing even in the rural districts. This movement limits the use of wood more to the interior trim and for such exterior ornament as piazzas, pergolas and similar features of the modern country home.

The questions of cost and artistic effects have always been potent in deciding the general nature of house construction. Formerly the cost of fire proof construction was so much in excess of wooden frame construction that it had little chance to compete with it, but this difficulty has been largely removed in recent years by the reduction in the cost of fire proof bricks, hollow terra cotta building blocks, concrete building blocks and other structural materials. Lumber has advanced in price in almost direct proportion to the cheapening of fire proof materials. This fact has driven many to consider the value of the new construction materials.

Architects who formerly found it easier to work in wood have demonstrated their ability to design country homes of great beauty and artistic effects with fire proof materials. It is no longer considered impossible to produce a country home of brick, stone and terra cotta in perfect harmony with rural surroundings; and types of this class of houses are multiplying in all parts of the country. The remarkable popularity of hollow concrete building blocks is typical of the new movement. Thousands of country houses are being constructed of concrete blocks, with only such use of wood as deemed necessary to give a perfect finish to the interior and exterior.

The use of hollow terra cotta building blocks is older in our cities than concrete blocks, and most of the large hotels, apartment houses, skyscrapers and public buildings are composed of this material. With iron skeleton frame work to carry the load up to almost any height desired the work of protecting it inside and outside with porous hollow terra cotta blocks has been simple and effective. A fire originating inside or outside of such a building has little chance of warping the metal or spreading from one room to another.

The adaption of this form of construction to isolated country homes marks a comparatively new departure. While recognizing the value of fire proof clay for building purposes, architects and builders have met with the obstacle that a good deal of iron frame work is needed to give the buildings strength and rigidity. This so materially added to the cost of the country

Entrance Gateway to Los Portales, Bakersfield, Residence of Mr. W. S. Tevis C-395
Henry A. Schulze, Architect

Reading-Room in Natural Sciences Building, Stanford University *Henry A. Schulze, Architect* C-396

buildings that few cared to undertake the work. Not until a type of houses could be designed which could be built without the iron skeleton work was it possible for burnt clay tiles, bricks and blocks to become popular.

The development and improvement of building materials in this particular have largely removed this objection. It is possible to use terra cotta materials and hollow burnt clay blocks so that country homes can be put up at little more cost than for a wooden structure, and without the use of iron frame work. A number of structures of this type are springing up in many parts of the country and a study of some of their features is particularly valuable. Walls, partitions, roofs and ceilings are constructed of terra cotta blocks, so that the houses are not only fire proof but well protected from vibration, vermin and excessive changes in temperature. They are more durable than almost any other class of structures erected, and, like the skyscrapers of our cities, they promise to last for centuries without any great deterioration. They possess certain other advantages, such as proof against the action of weather, and thus need no painting and periodic repairs, and much cheaper to insure against fire.

One of the most recent illustrations of the modern buildings in which fire proof materials are used without iron skeleton work for supporting floors and roofs is the new Madison Avenue Presbyterian Church. The walls of this structure are of brick and hollow terra cotta blocks, and the roof consists of a great dome over 50 feet in diameter which springs from the walls without metal support of any kind. The arched dome is built up of fire proof clay tiles averaging 6 x 12 inches, laid in courses of cement, and designed so that the keystone of the arch carries the whole load. There is not a particle of metal used for sustaining this great dome, and yet it is so perfectly fire proof that no interior fire could damage the roof or affect it in any way.

The modern terra cotta or clay tiles are burnt in kilns to a temperature of from 2000 to 2500 degrees F., and as a result of this form of manufacture it is impossible for them to be affected by the hottest fire that is likely to rage in a building, even when fed by highly inflammable material. Up to this high temperature the tiles or blocks do not warp, crack or sag. Consequently when used as floors, roofs, partitions or ceilings they restrain the spread of an interior fire.

The question of strength is the next important consideration for a builder or architect. In building the new domes and arches of fire proof tiles the cohesive strength or resistance to shearing of two hard tiles cemented together with good Portland cement is equal to 124 pounds to the square inch. The tiles are made as hard as the cement, and when made into the form of an arch the two become a homogeneous whole. But the arches are built up of several courses, so that resistance of over 2000 pounds to the square inch is obtained.

But the modern fire proof tile arch is not of so much value to the builder of the country house as the flat arches made of hollow terra cotta tiles reinforced with steel wires inbedded in the materials. The wire reinforcements carry the load and the floor or ceiling of tiles is laid on top of it. The basis of the flooring is formed of large steel wires transversely interwoven with still larger wires placed 4 inches apart. Over and through these wires the cement is placed and the tiles set longitudinally until a complete monolith or homogeneous floor is formed. The wire truss reinforcement is cut according to measurements and shipped in reels, so that a builder or contractor can easily put it in position. Every part of the metal is protected by cement mortar or fire proof clay tiles from any exposure to fire. The result is a perfect floor or ceiling is formed without the use of steel frame work, which in case of fire would resist high temperatures as much as a floor of a modern fire proof skyscraper in our cities.

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Relative Strength of Spans.

The relative strength of such floor spans is greater than ever required for ordinary houses, and the span can extend to 25 and more feet by increasing the tile and reinforcement. In tests with live loads a span of 16 feet between girders has carried 733 pounds to the square foot, or a total of 187,680 pounds on the whole floor. By dispensing with steel beams a great saving is obtained. This method of building has been adopted in many city structures, notably the Chicago Post Office, where heavy loads must be carried. The metal is so imbedded in the cement mortar that it is impossible for it to rust and deteriorate, and its life is as long as the building materials which it supports.

With the flooring or ceiling once formed, the finish can be made in wood, tile or mosaic work or gravel, with suitable roofing material. Wooden beams can be laid on top of the tiles and wooden floors nailed to them in the old way, or plastic materials which give a firm, hard, fire proof floor can be employed. The ceiling can be finished in the ordinary way or with stamped metal ceilings. Even should the latter be warped and melted by a hot interior fire it would not affect the strength of the floor, for the latter is built independent of it, and with every part of the metal inclosed in cement at least 1 inch thick.

The walls of such a building are composed of 8, 10 or 12 inch hollow tile blocks. The metal reinforcements are imbedded in the outside brick walls, so that almost any requirement of a house can be met. Where mills, factories or storage houses use this system of floors iron columns are employed for attaching the reinforcements, but an ordinary country house demands no such strength in its floors. The walls of the house are built of any desirable bricks, plain or faced, and one course of plain hollow terra cotta blocks inside of the walls for fire resisting purposes. This course of hollow blocks meets with and is joined to the blocks of the floors and partitions. In this way each room becomes a fire proof box, in which any interior fire could be confined. The hollow tiles for interior of walls are made with rough faces for wall furring, so that the ordinary plaster can be used.

Ordinary terra cotta partitions can be laid by the bricklayer, but the best Portland cement must be used, so that when it hardens it will be as firm and fire resisting as the tiles or blocks. The porous terra cotta blocks are manufactured for interior use, so that nails can be driven in them. By means of this the interior trim of wood can be nailed to the walls or base. The interior of the porous blocks is furred for receiving plaster or left smooth for paint and whitewash or enamel. Enameled and tinted fire proof clay tiles for interior decoration have been employed in the main ceilings of the first floors of the new Tiffany and Gorham buildings in New York and their effect is very striking. They illustrate a new departure in this use of tiles. The colors and glazing are burnt into the tiles after designs made by the architects, and no amount of dirt, grease or smoke can injure them. An annual washing is all that will be required to keep them in a perfectly fresh and sanitary condition. Similarly in country homes such tiles can be exposed for artistic as well as useful effects.

Partition Tiles.

The terra cotta tiles used for partitions are usually 8 x 8 or 12 x 12 inches, with the thickness adjusted to suit special cases. The partitions are usually 3 to 4 inches thick. The blocks are set up on end, except the top course, which is placed on the side to give a finish. In some of the higher priced country homes of this character the brick walls are lined with fire proof clay tiles inside and outside. The outside course is of more dense material than the inside and is hard burned, with smooth surface. The protection of the bricks from disintegrating effects of weather is thus so great as to increase the durability of the building from 10 to 20 per cent.

There is another use of hollow fire proof clay products that has many advantages. They are sometimes laid on wooden beams which are strung across from brick walls to carry the load. A 3 or 4 inch course of hollow blocks protects the wood from fire up to a temperature of nearly 1000 degrees. After that, in spite of the nonconducting qualities of the terra cotta, the wooden beams might char and fall. The under parts of the beams are protected by 2-inch ceiling blocks secured by means of screws and washers. In this case the fire can cause no damage until the metal screws and washers melt or warp and thus loosen the blocks. This method of structure has been approved by many city building commissioners, so that walls and ceilings are rendered comparatively fire proof.

Fire proof clay building blocks and tiles are the lightest of all materials of this class, and the additional load which they give to a floor supported by wooden beams is very inconsiderable. A cubic foot of terra cotta hollow tile weighs about 40 pounds, while the lightest cinder concrete suitable for floors and arches weighs upward of 90 pounds. A wooden floor composed of thin maple strips of flooring, spruce sleepers and plastering would weigh nearly half as much as a floor composed of wooden beams with an under course of hollow tile blocks and an upper one of the same material. Where reinforced metal trusses are used the difference in the weight is slightly increased.

The whole question of adapting burnt clay products to house construction in the country is one of cost, durability, strength and beauty. The cost has been so materially reduced in recent years by the introduction of labor saving machinery that it is almost on a par with wooden construction. In special localities fire proof clay tile houses have been built at the same estimated cost demanded for wooden frame structures. There is no question about the greater durability of the terra cotta house nor any doubt about its fire proof advantages. The strength of floors and arches without the use of iron beams and girders has likewise been satisfactorily solved in the last few years. The tests given have been made to meet requirements of city laws, which are much more stringent than those in the country districts.

* * *

The Universal Building Material[*]

By F. W. FITZPATRICK

FROM time immemorial has gold been the standard of value, the basis of monetary system, the most precious and esteemed of metals in ordinary use in all civilized nations; so has burnt clay generally represented the highest standard, the perfection of the craftsman's art of building, and so is it generally accepted as the most indubitable, authentic and best preserved record of the history of past times. True, patriots—misguided or otherwise—have tampered with this standard, too, have sought to put baser materials on a par with it, have endeavored to write history on stone and marble, and, even for long periods, have they succeeded in placing the art of clay modeling and baking in the limbo of oblivion; but, phoenix-like—to use a much hackneyed term—it has always risen, not from its ashes, because you cannot reduce it to ashes, but from the "slough of despond" as it were, in a glorious renaissance, to its own high natural and legitimate estate.

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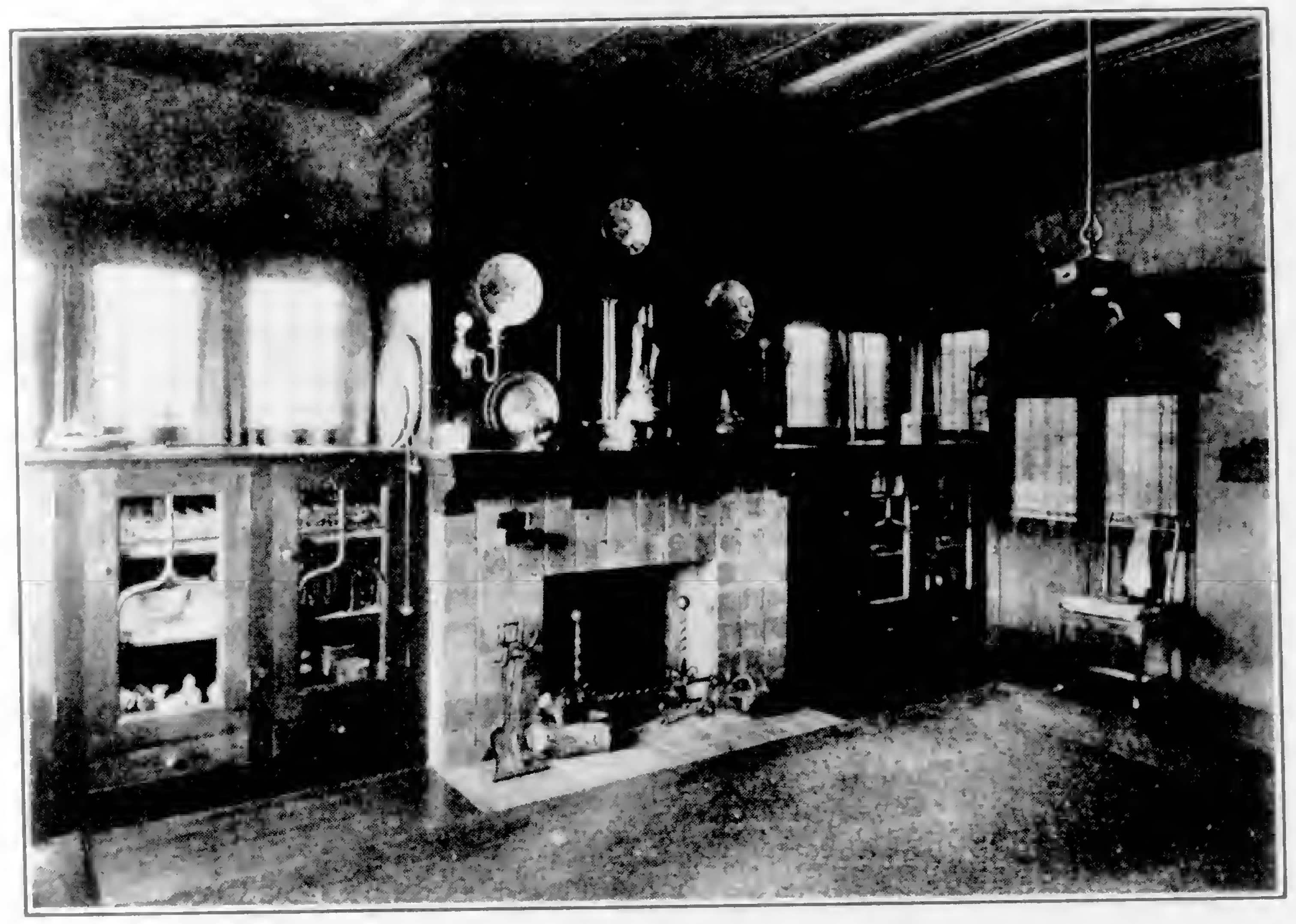
[*] Read at the Brickmakers' Convention, January, '06.

Library in Residence of Rudolph and Hugo Taussig Edgar A. Mathews, Architect C-397
Panel Decorations by Mr. Arthur F. Mathews



Dining-Room in Residence of Rudolph and Hugo Taussig Edgar A. Mathews, Architect C-398

We find sun-baked bricks in Egypt, Assyria and the older towns of India that must be at least 3,000 years old. And year by year new excavations reveal to us that brickmaking was know long 'ere that period. In the ruins of Babylonia we find kiln baked brick of most excellent make and shape, even enameled and ornamented. Rome built much of brick and introduced the art into England. Flemish workmen continued the work begun there by the Romans, but we find no record of brick being made by the proverbially slow but sure Englishman prior to 1260. Naturally brickmaking reached its perfection in lands where stone was uncommon.

As naturally, in far remote times, where it was at all procurable, timber was mostly used in building the rude shelters of men; then stone was roughly shaped and made to do duty, there where great permanency was desired, for the parts that had formerly been of wood, and there, for instance, we have the origin of the column and the lintel. In places where stone was difficult to secure, and possibly timber, too, brickmaking was resorted to, at first as a mere substitute for stone, and later as a preferable medium of expression and construction. It was found that the parts, the units being small, were easily handled and constituted a building material far more adaptable to the necessities, the varying purposes, particularly of people peaceful in their ways and not blessed or cursed with slave labor. Ornamenting the surfaces, enameling in beautiful colors, were natural steps in the development of the art that was brought to very high perfection in Assyria and Persia.

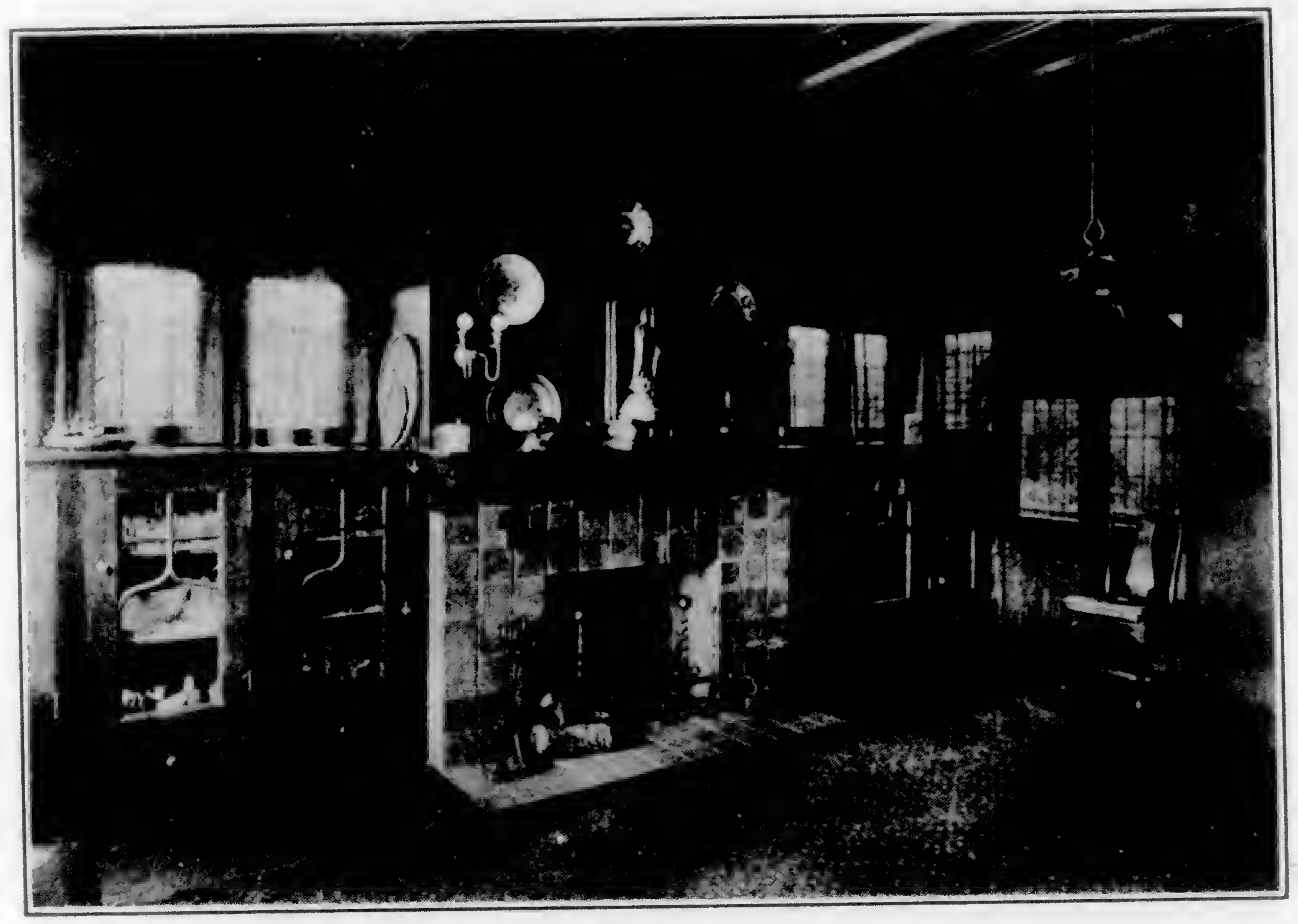
The Christians borrowed that art and applied it with success in their new capital in Byzantium, where, under the Emperor Brazil, it reached its very apogee. Later still, the followers of Mahomet, at first, rude barbarians and despoilers of everything artistic, little by little fell under the sway of oriental art and began to use burnt clay in all its varied forms themselves. With Persian artists in their midst, Constantinople their headquarters, India, their storehouse, and fresh art treasures and libraries and masters falling into their hands every day, they could not long withstand the pressure. From brutal barbarity they became protectors, defenders, patrons, nay, very masters of the arts and sciences! Persian art then became Arabian art—by right of conquest. The followers of Mahomet still carried the sword and ruled by it; but then, the highest civilization was also carried along by them and we have them to thank for the preservation of the ceramic art to our time.

I say "preservation" of the art advisedly. They gave us store-houses of it, as it were, for it has been preserved in that sense alone. It has been shelved for ages, or, if used at all, merely as a plaything and only to-day is it being really revived and applied largely, coming into its own again and taking its place among the greatest works of man.

In England brick, terra cotta and pottery and tile were quite a little in vogue in the beginning of the eighteenth century, but after Queen Anne, there was a reversion to baser forms; wood and plaster predominated, and even in this country we still see perpetrations, awful nightmares, doing duty under the guise of "Queen Anne" cottages, a synonym for anything that is too ugly to have any other name.

Here in the United States we have never had what might be called an era of burnt clay. We have only comparatively recently acquired great skill in that art. Up to a very short time ago, men built here with anything they could get easily and cheaply. We have had a galvanized iron era, a gingerbread wooden work era, concrete block crazes and all that sort of thing, but the popular prejudice has always been that when a man could afford to set rigid economy aside, then granite, marble and stone were the proper expressions for his building. Those materials exemplified, typified wealth, taste and culture. Brick and terra cotta were used where cheaper substitutes became

Library in Residence of Rudolph and Hugo Taussig *Edgar A. Mathews, Architect* C-397
Panel Decorations by Mr. Arthur F. Mathews



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And yet, with us, must as we know about it and however well we do it, that art is in its very infancy. Its possibilities are endless, the field before us absolutely unlimited.

When I say that the art is in its "infancy," I must qualify that term. The infant is, indeed, a lusty one. We have made wonderful strides and, unlike most infants, we have profited by the experience of other countries and other times. Though we admit our extreme youth, we have picked up the art and are continuing it from where others left off, and we are not going over the whole process of growth, as most infants do. No country on earth makes better or handsomer bricks than we do; our enameled bricks are the equal of any; our terra cotta surpasses in beauty and perfection that made by any other people at any other time. Why, the Winkle exhibit at the St. Louis Exposition taken alone, without considering any of the other beautiful works there, was sufficient to place us in the foremost rank of modelers and craftsmen, shoulder to shoulder with the makers of terra cotta in any other time or clime. It spelled perfection. Let the dust and mellowing influences of time touch it here and there and you will have people raving over it as they do now over Della Robia. And our pottery cannot be classified far down the line.

Another thing this country has done in the matter of burnt clay of which we are justly proud. Here, some thirty years ago, was devised the first hollow tile building block for floor and partition construction. It came as an experiment, but in the thirty years that have followed it has not fallen short of the promise made for it then. It has stood the brunt of crushing strain and terrible fire, and that it has made a place for itself and is an accepted factor, not only in the art of burning clay, but is a most important and essential factor in modern construction, is proven by the fact that there are already 700,000,000 square feet of it in place in this country to-day!

Just now there is being waged something of a puny warfare against burnt clay in all its forms by the advocates of concrete construction. Now, no man is a firmer believer in concrete—in its proper place—than I, and, few, indeed, have used more of the material, but I tell you some engineers and the producers of cement have gone concrete-crazy. They advocate it as a penacea for all ills, the one material to be used under all conditions and to the absolute elimination of all else. They gabble to us to-day about hollow concrete blocks for exterior work, slab concrete floors and partitions for interior work, concrete everywhere. And they tell us that it is but a revival of the old Roman construction that was so perfect and that has stood so long. You will hear the learned engineers constantly prating about the splendid dome of the Pantheon at Rome, the greatest piece of vaulting that was ever done, as the apotheosis of concrete construction. Bless you, the main ribs of that magnificent vault are built, not of concrete, not of stone, not of steel, but of a far more perfect material, BRICK. The whole thing is essentially a brick construction with concrete filling between those brick ribs merely forming the sunken panels of the ceiling. The Romans did do some very important concrete work, however. They certainly used very wide spans in their floor construction. In that respect our concrete friends of to-day, with all their vaunted engineering ability, are far more modest than were their predecessors under the Roman Emperors. But, then, conditions of our civilization would not permit of the old time temerity. We wouldn't stand for the loss of life that was quite permissible in those times. To-day great commotion is made whenever there is a concrete collapse in which one or two poor workmen are killed, and Heaven knows such collapses are frequent enough. In the time of the Emperors slave labor was used, and a few hundred poor devils, more or less, was not a matter of grave importance, though we do find it recorded that Vitruvius, the famed military engineer of Augustus' first epoch, protested vigorously to his Emperor against the practice of building with concrete on account of the resulting accidents to and deaths of a great number of slaves, and he recommended the use of brick, in part or entirely, in place of concrete, as a better material and as far more merciful to humanity.

One of the theories advanced by our concrete friends in support of their concrete blocks and other forms of construction is that it is cheaper than burnt clay. One way to make it cheaper is to use, as nine-tenths of them do, unskilled labor. It is the contest between rude material and unskilled labor, with masses of greater volume and weight on one side, and on the other selected material and skilled labor, with masses of less volume and less weight. Take your choice.

There are a thousand legitimate ways of using concrete. It is admirable for foundations of buildings, fillings of piers, railroad work, bridges, subaqueous work, anywhere used in compression and in masses, and where it is not exposed to intense heat. But when you come to use a thin slab of it twenty feet or more in span, for flooring purposes, you are incurring great peril indeed. 'Tis no better than a slab of stone the same size, and a flaw in it is just as possible as in the stone; more so, for less skillful artificers have fashioned it, and where there is a flaw there is weakness, and the whole is but as strong as its weakest part; the folly of building of large units and using unskilled labor to make them! Folly? I call it a crime.

One-half the trouble is that the cement producers are ravenously clamoring for a new market and care not one whit how cement be used, provided they can sell it. There is danger that they will work out the construction of a most useful material by abusing it and incurring popular disfavor.

They claim for the construction that it is essentially "fire proof." The highest authorities tell us, and our everyday experience proves to us the incorrectness of the statement, that even when Portland cement is properly made its fire-resisting qualities may be considered to 600 degrees, but when subjected to subsequent drenching, the result is disastrous. Why, 600 degrees is no heat at all for a fire. At extremely high temperatures concrete will disintegrate, just the same as will limestone, or granite, or marble. And yet they wish to put those materials in comparison with brick as fire-resisting! Did you ever hear and see granite and limestone and marble in a fire? It all steams and pops and explodes and goes to pieces in a Fourth-of-July like celebration. Concrete makes less noise about its disintegration, particularly if water be thrown upon it, is far more insidious and is just as complete. The worst feature about it is that they persist in exploiting "cinder" concrete, naturally because it is cheaper, and "cinders," the country over, is a mere synonym for ashes, and when mixed with cement is just so much mud.

What was it that stood the test of the Baltimore fire, was it granite, or stone, or concrete? What has become of three little and much-vaunted examples of concrete construction there? No, it was the tall brick and tile fire-proof structures that withstood that awful test. And they were only commercially fire-proof at that, built at the minimum cost and, in most cases, years ago when comparatively little was known about fire-proof construction, yet those are the structures which stood up, that suffered only 7 to 10% in their structural parts and that literally saved Baltimore, for had it not been for that splendid bulwark of brick buildings the fire would surely have had a clean sweep for miles. Aye, and perhaps the entire city might have been laid in ashes.

They are giving us hollow concrete blocks as something new. They were quite commonly used forty years ago and were then, as now, called "fire-proof." But the Chicago fire of '71 demonstrated beyond peradventure the inefficiency of concrete as fire-proofing and clearly established the superiority of burnt clay over all known structural materials. And Baltimore but corroborates that experience. Burnt clay has stood the test of time and fire and water, and since the era of tall buildings it has been used in over 90% of them. You seldom hear even a concrete man offering any criticisms of burnt clay. No, he but loudly proclaims that he has something cheaper, and, if he is very daring, "equally as good." The very best of concrete is made with Portland cement, slag, crushed clinkers, or real, completely corbonized, stem cinders, or broken bricks or tile, and in such amalgamation, and in sufficient quantities and with sufficient steel to act as a good floor or wall construction, and made by skilled artificers, it is **not** as cheap as burnt clay and never will be as fire-proof.

One objection the concrete people cite against burnt clay for building construction is that in using brick or hollow tile for floor arches, rolled steel members have also to be used, and that there is frequently great delay in procuring that steel. Thanks to Mr. E. V. Johnson, the son of the first really scientific adaptor, if not the inventor, of hollow block tile flooring, we can now put up a building entirely of brick and terra cotta, without any steel beams for the floors or steel rods for tying purposes, or steel or iron columns,-an absolutely all-burnt-clay building. The same gentleman has also made it possible to use burnt clay products in lofty grain elevator bins, smoke-stacks, and that sort of construction where heavy brick walls are not possible. Indeed, we must credit him with many improvements connected with the art of clay burning.

Much ado is generally made about Underwriters' requirements and methods. Whatever the insurance people do in the way of construction is looked upon by the masses, and with some reason, as being the perfection of construction, a model to go by. The Underwriters some time ago decided to erect a model building in Chicago as a testing laboratory. All sorts of things were at first proposed. Alleged "slow-burning" wood construction (that has long been a pet foible of the insurance folks), concrete and whatnot. But thanks mostly to Mr. Johnson, the Underwriters, this time at least, built perfectly, and their laboratory in Chicago stands as a model of what ought to be done. It is built of brick and tile and terra cotta, a full-fledged, thoroughly fire-proof, one may say, all-burnt-clay building.

The National Fire Proofing Company, of which Mr. Johnson is Western Manager also maintains a very fine laboratory in Chicago. There they test not only their own products, but concrete and everything that comes to hand. Experiments in all classes of construction and all classes of material are constantly being made on a large scale, and the work being done scientifically and thoroughly is of the utmost benefit to the building trades and should receive their hearty support and co-operation. I know that the Company will be very glad to test anything in the way of new shapes of bricks, etc., that you gentlemen might wish to send them. There is no better equipped laboratory in the country, both as to testing apparatus and skilled physicists, engineers and chemists.

Speaking of laboratories and tests, that is one point about which I wish to take the brickmakers to task. You are making splendid products, but this is a progressive age. Perfect as is anything you may have, it is, in the vernacular "up to you" to strive to do still better. I believe that our brickmakers are too well satisfied. We are using the shapes and molds that our fathers did. We have Roman shapes, Flemish shapes, and the molds of a time when Romanesque and crude classic forms were in vogue, and all that sort of thing, but it strikes me that we should go beyond all that and study the exact needs that our modern problems present, and then strive to put upon the market something that will exactly fit those requirements, and not try to beat the requirements into shape to fit what you are now supplying. Take molded brick, for instance, the accepted possibilities of ornamentation in that medium are indeed limited. We should experiment and design and work and fail and try again, till we get shapes and ornaments that will fit almost anything an architect can design. We should make bricks, not only the enameled, but ordinary face brick, of any color and surface. It wouldn't take long for architects to rise to the possibilities of such things and give us splendid chromatic effects instead of the monotonous fronts we see all about us in our cities. I am sick of red buildings, of buff buildings, and of gray buildings. Give us some other key to the gamut of colors. Most of us Americans are veritable cowards when it comes to color. Why, it would pay you thousands per cent. to have some really capable designer, an artist, not mere draftsman, give his whole time and attention to the possibilities of brick, to devising forms of cornices, string courses, sills, window caps, panels, fashioned out of brick and susceptible, by merely interchanging, of endless and most beautiful combinations. The things that you have under the guise of ornamental brick to-day, gentlemen, are not worthy of you. Well as we all think you have done, you could, with your splendid American ingenuity, skill and indomitable courage, do ten thousand times better.

And so, too, with terra cotta. I said we did splendid work in that material, and we do. Beautiful modeling, mechanically perfect assemblage. But we have fallen into the way of accepting certain limitations as absolute. I am not unaware of the difficulties there are in making terra cotta, but I also know that to us Americans, difficulties simply mean things that must be surmounted. Well, then, architects very frequently object to terra cotta solely for the reason that its parts, or units, have to be comparatively small. They have been used to cornices of stone for instance, where they use lengths of six, or ten feet or even more; they are accustomed to thinking that sort of thing massive and impressive by reason of that fact. Then why on earth not give them the same thing in terra cotta, columns in one piece instead of cutting them up in short drums, wide lengths of cornices? Oh, yes, I know the objections; big pieces warp and twist and shrink and the wastage is enormous. But go ahead and experiment! Spend some of your surplus in trying new ways of handling and burning your clay; it's worth it. The man who discovers how to do it will not only make a fortune for himself, but will pass down to posterity as one of the great inventors of this inventive time. And that indeed, is honor. We have electricity, why cannot, by some means of metal bands or coils in the core, heat be uniformly applied to all parts of the clay form at once and of equal temperature? There is some way of doing it. If I knew how I would tell you. Or, if you cannot possibly make long pieces, then try and fix up the joints so they are not so conspicuous. Something can surely be done. You are not going to supinely give in and admit that they can do in stone or concrete or galvanized iron that which you cannot. Try to at least go one better. Work at it, experiment, and if you fail, why, try again! As the French say the "game is well worth the candle."

Building constitutes to-day one of the most important functions of man. Countless billions of money are being spent in construction. The work calls for the brightest and best intellects. There is no room at the top for torpor and complacency. The Motto must be "On and Up." The place occupied by burnt clay to-day is a lofty one. That is recognized and conceded even by those most violently opposed to it, and is what hurts them most. It has reached that exalted position largely by its intrinsic merits, true, but it has taken good, hard, intelligent, earnest work to have those merits recognized, to put those very inherent qualities in tangible form, to make them of practicable utility. We must not relax in those efforts. We must not sit down and say work has been well done, we are pleased with it and will now rest. The thing is to be up and at it, hammer and tongs, shoulder to shoulder, in an earnest, persevering, well-directed effort to not only keep burnt clay in that splendid place it has reached, but to force it ever upward, by every legitimate means in our power, until it becomes in fact what we believe and know it ought by rights to be, the UNIVERSAL BUILDING MATERIAL!

I Am a Brick

By W. E. DENNISON

What am I,
That I should see my maker's clay
Within my walls entombed to-day,
And know full well a century hence
Naught else shall live to show his sense?
I am a brick.

What am I,
That men should strive on Babel's tower
To lay me up to show their power;
Displeasing God, laid down their tools;
Dispersed as history's banner fools?
I am a brick.

What am I,
Though formed of clay, have seen the end
Of countless reigns, and yet defend
My title to the oldest place
On scroll of deeds of human race?
I am a brick.

What am I,
That I should take a lowly seat,
Or sit at anybody's feet,
When I compose the pyramid?
Of would-be doers I'm still the "Did."
I am a brick.

Scene along the California Northwestern Railroad

C-399

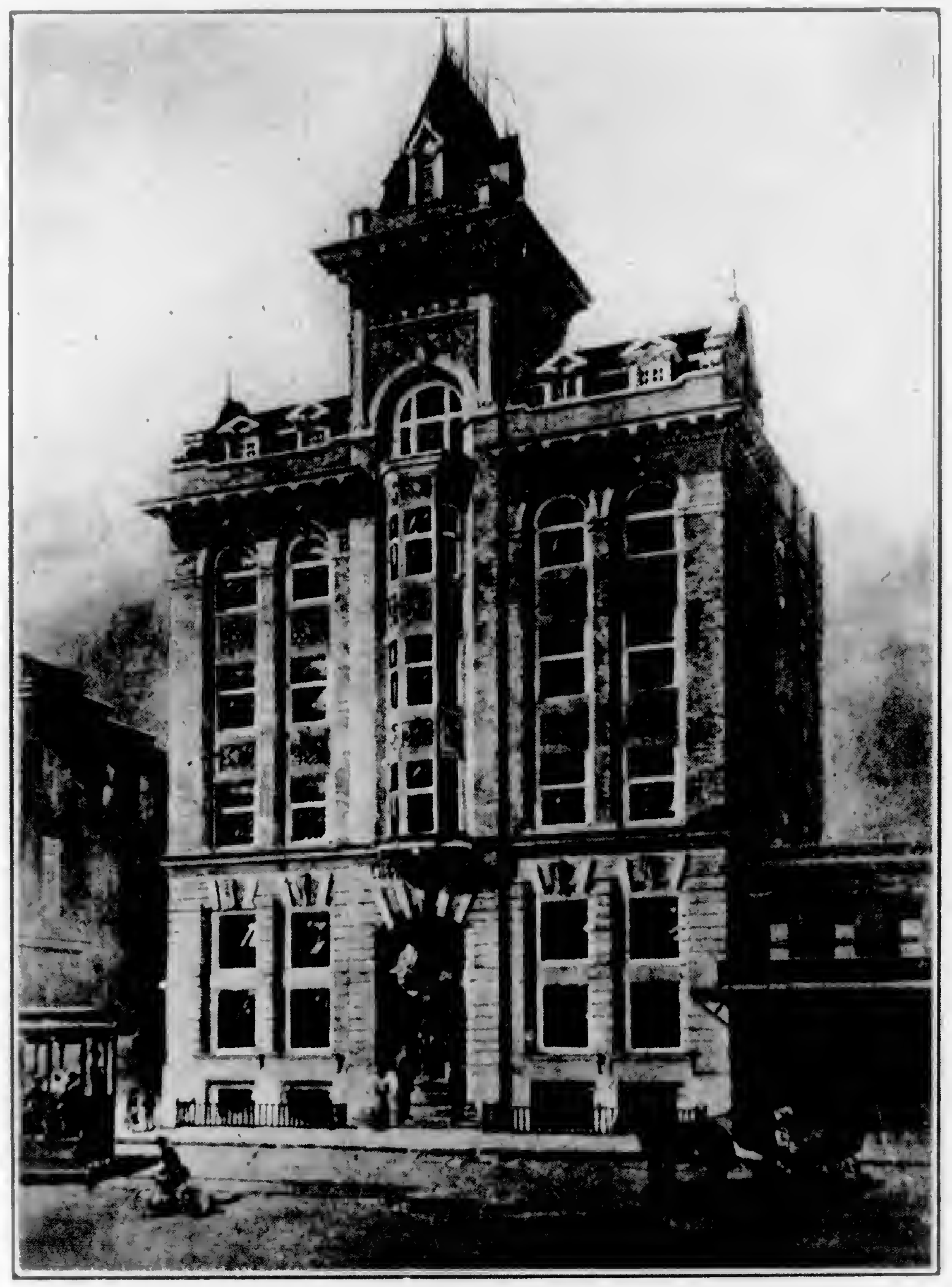
California's Garden Spot

THE approach of the vacation season starts one to thinking where he shall spend a week or more of pleasant idleness. One of the attractive spots in California is along the picturesque route of the California Northwestern in Marin, Sonoma, Mendocino and Lake counties. Valleys large and small, rolling foothills, and hills of moderate ranges well wooded, numerous creeks and rivers and lakes, fresh-water springs everywhere, and a salubrious climate, combine to make this territory an ideal agricultural one.

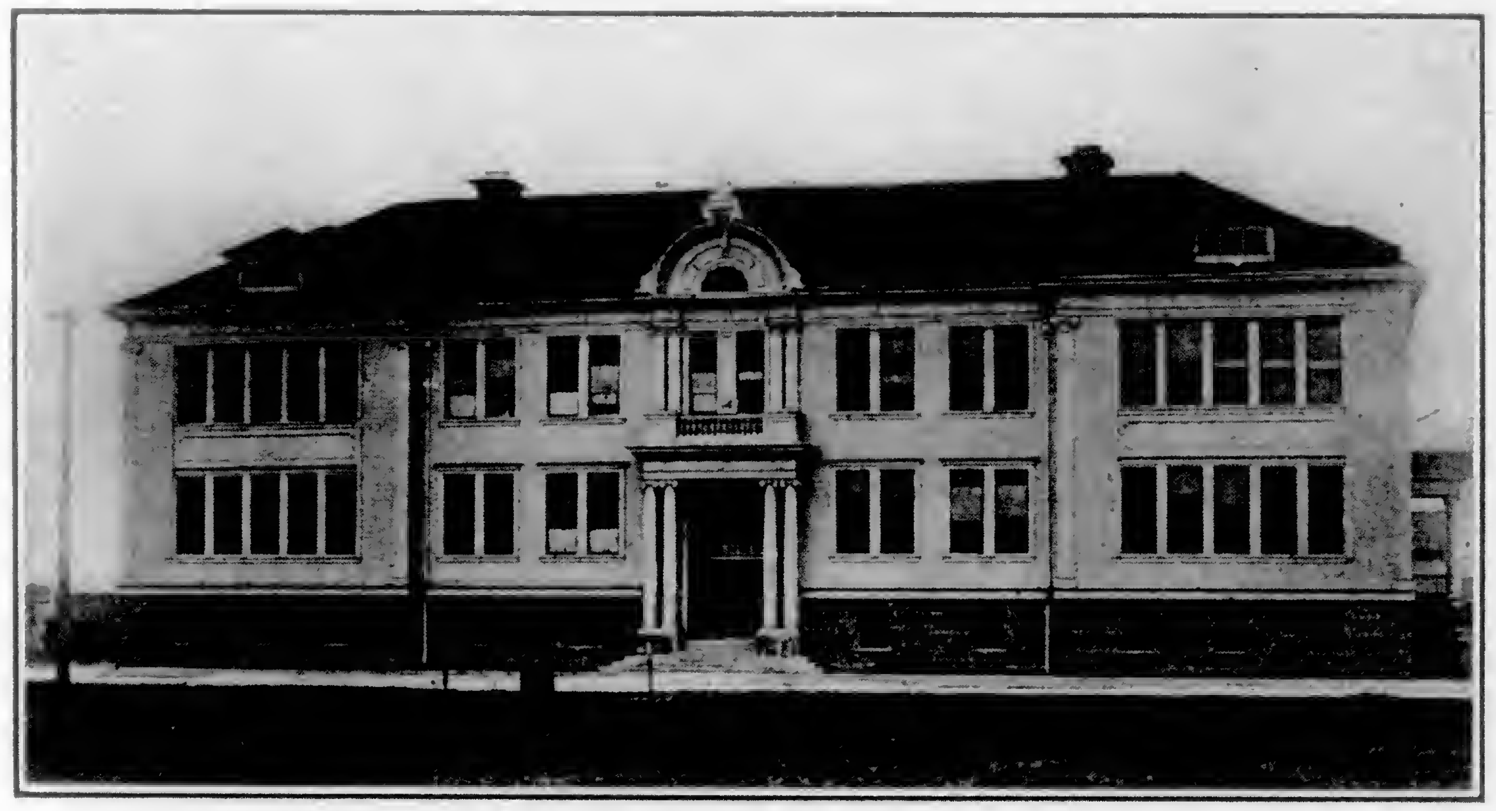
Along the western side of Sonoma and Mendocino counties lies an immense forest of redwood trees, whose towering size represents the sublimity of growth in nature.

The "Garden Spot" is reached from San Francisco, by large ferry-boats, which transport you from depot, foot of Market street, across the bay to Tiburon, a distance of six and a half miles; thence by trains of the California Northwestern Railway.

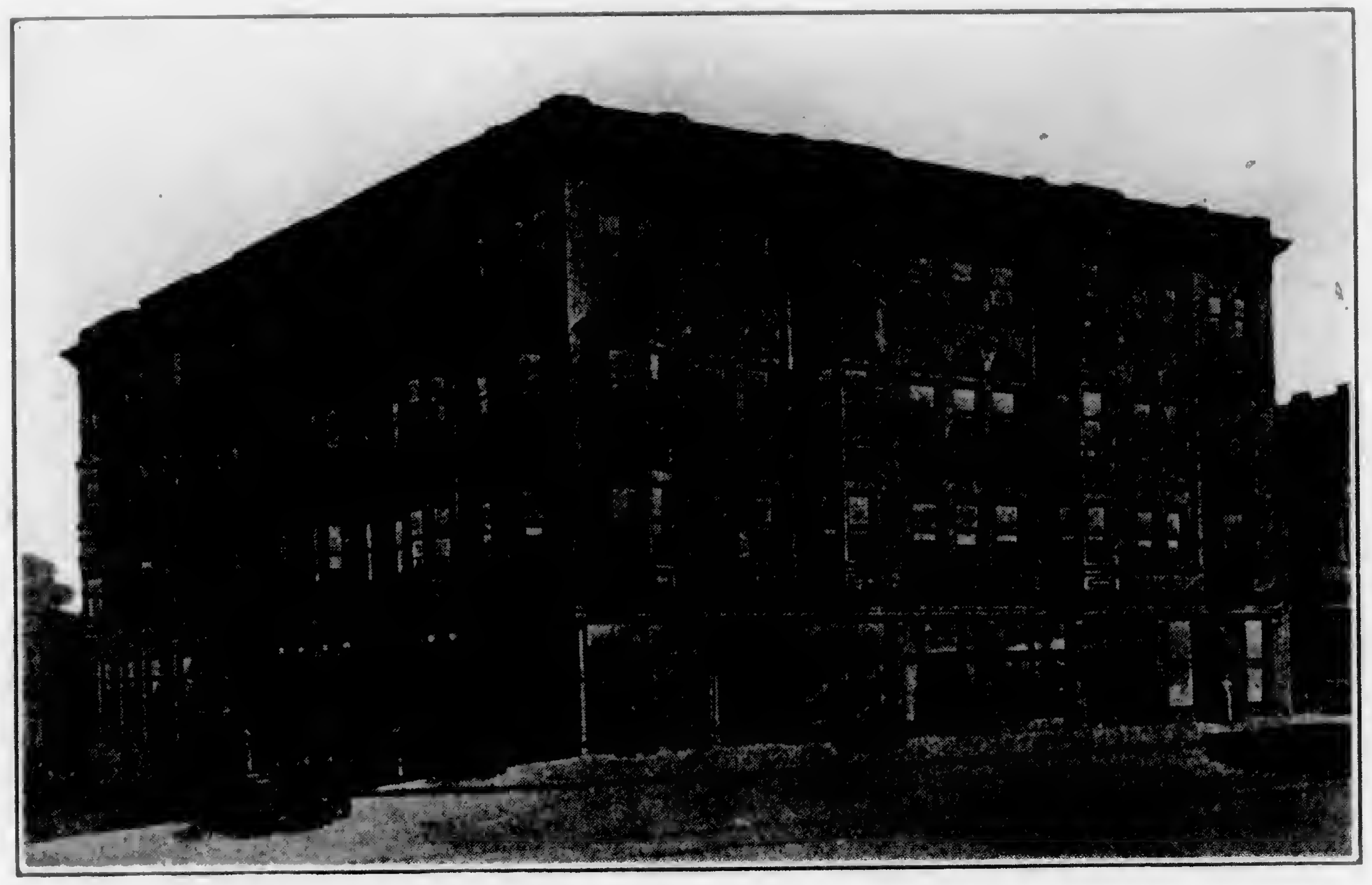
From Tiburon the main line extends to Willits, a distance of 138 miles from San Francisco, passing through San Rafael, Petaluma, Santa Rosa, Healdsburg, Geyserville, Cloverdale, Hopland, and Ukiah. From Ignacio, 23 miles from San Francisco, a branch runs through the historic and beautiful Sonoma Valley, and reaches Glen Ellen, 49 miles from San Francisco. From Santa Rosa, 52 miles from San Francisco, a branch 6 miles long runs to Sebastopol, 58 miles from San Francisco, tapping the Green Valley and Gold Ridge fruit country. Still another branch, 16 miles long, paralleling the Russian River, and tapping the "Vine Hill country," runs from Fulton, 4 miles north of Santa Rosa and 56 miles from San Francisco, to Guerneville, 72 miles from San Francisco.



Chamber of Commerce Building, Sacramento *R. A. Herold, Architect* C-400



Marshall Primary School, Sacramento *C. W. Dailey, Builder* C-401



Remodeled Capitol Hotel, Sacramento *Siller Bros., Builders* C-402
Cornice Work by Sinclair & Bessey *T. J. Pennish, Plaster Work*

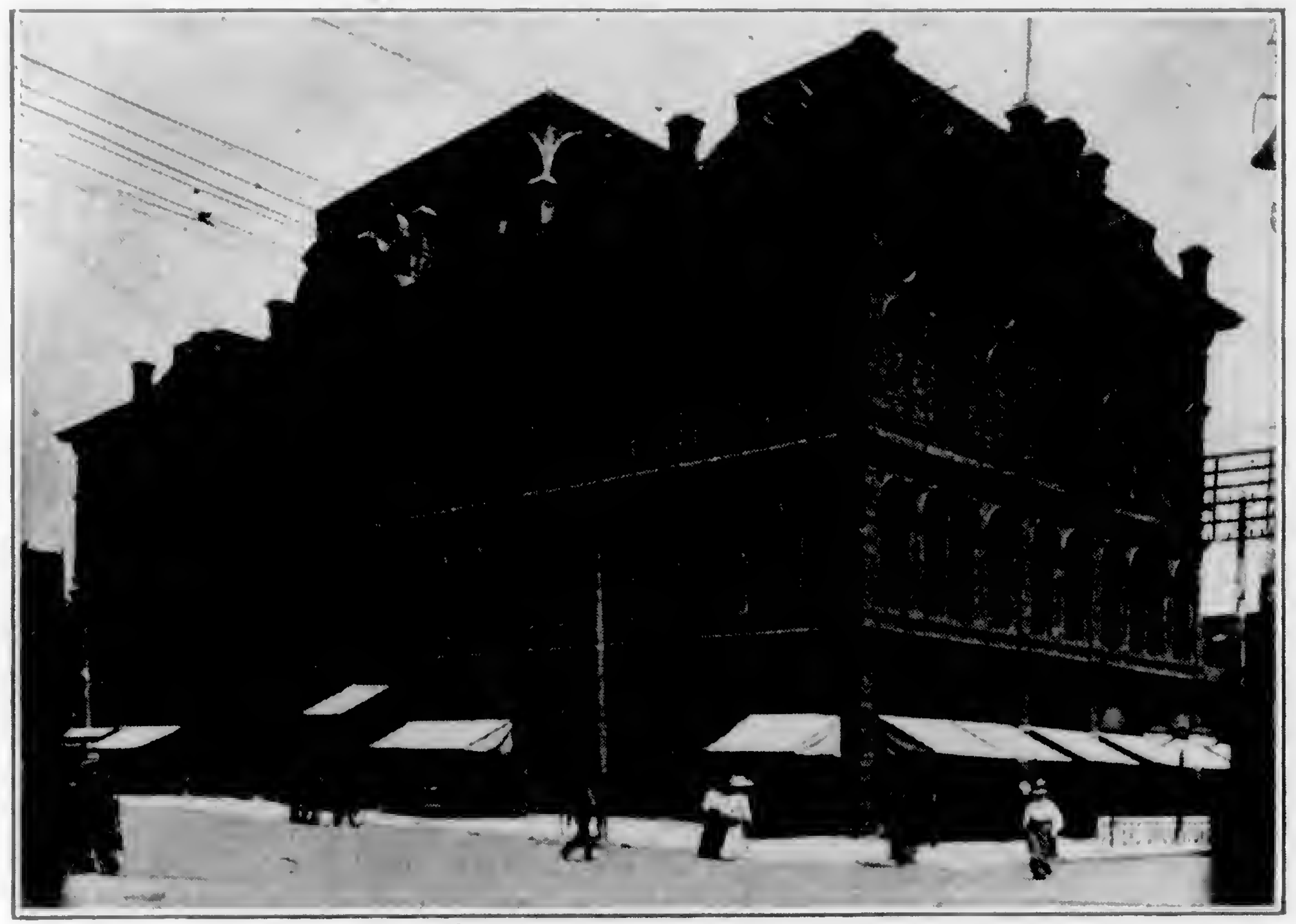
Some Sacramento Architecture

DURING the five years that R. A. Herold has been engaged in the practice of his profession in the city of Sacramento, there has been developed a long-needed reform in its architecture. The change is due as much, if not more, to the efforts of Mr. Herold as to the work of any other single builder or architect. To him Sacramento is indebted for the plans of the first modern office building, a creation that marks a new era in the city's development. His appointment by the Legislature to prepare estimates for the improvement of the State Capitol and his study of the building have made him an authority on this very important subject. Mr. Herold, although but 35 years of age, has spent half of that time in the study and practice of the profession of which he is so competent an exponent. He began his preparation in San Francisco, and later spent three years, devoted to study and research in the capitals of Europe. Five years ago he established his office in this city, and during this brief period has brought about almost a transformation in Sacramento's appearance.

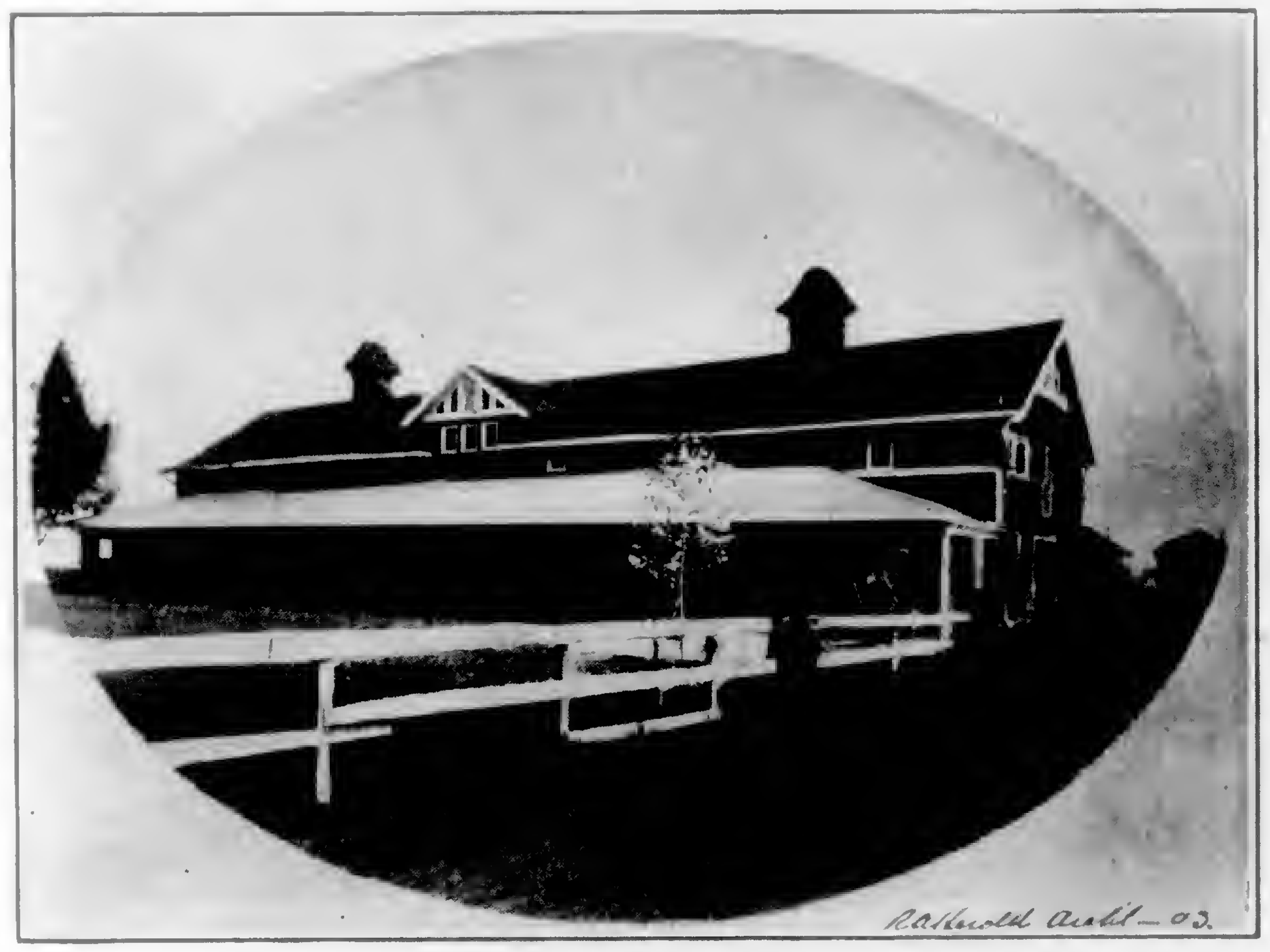
His talent has attracted to him the patronage of bankers and financiers, of the largest corporations in the city, and of the State and Municipal Governments. His manner of handling large subjects has furnished him a clientele from beyond the boundaries of the county, notably in the case of the High School at Auburn, Placer County.

Mr. Herold's plans for the Sacramento High School were most exactly fitted to the city's needs in this respect, and the completion of the building will assure him a lasting monument in the public opinion. His efforts to provide the business section with structures in keeping with the wealth and dignity of the State Capital have won for him a warm place in the estimation of the more progressive citizens, who still cherish hopes of a city beautiful on the broad river that marks its western limits.

The illustrations of buildings in Sacramento shown in this number are by Mr. Herold, and embrace practically every type of building from a church to a residence, and an office building to a livery stable.



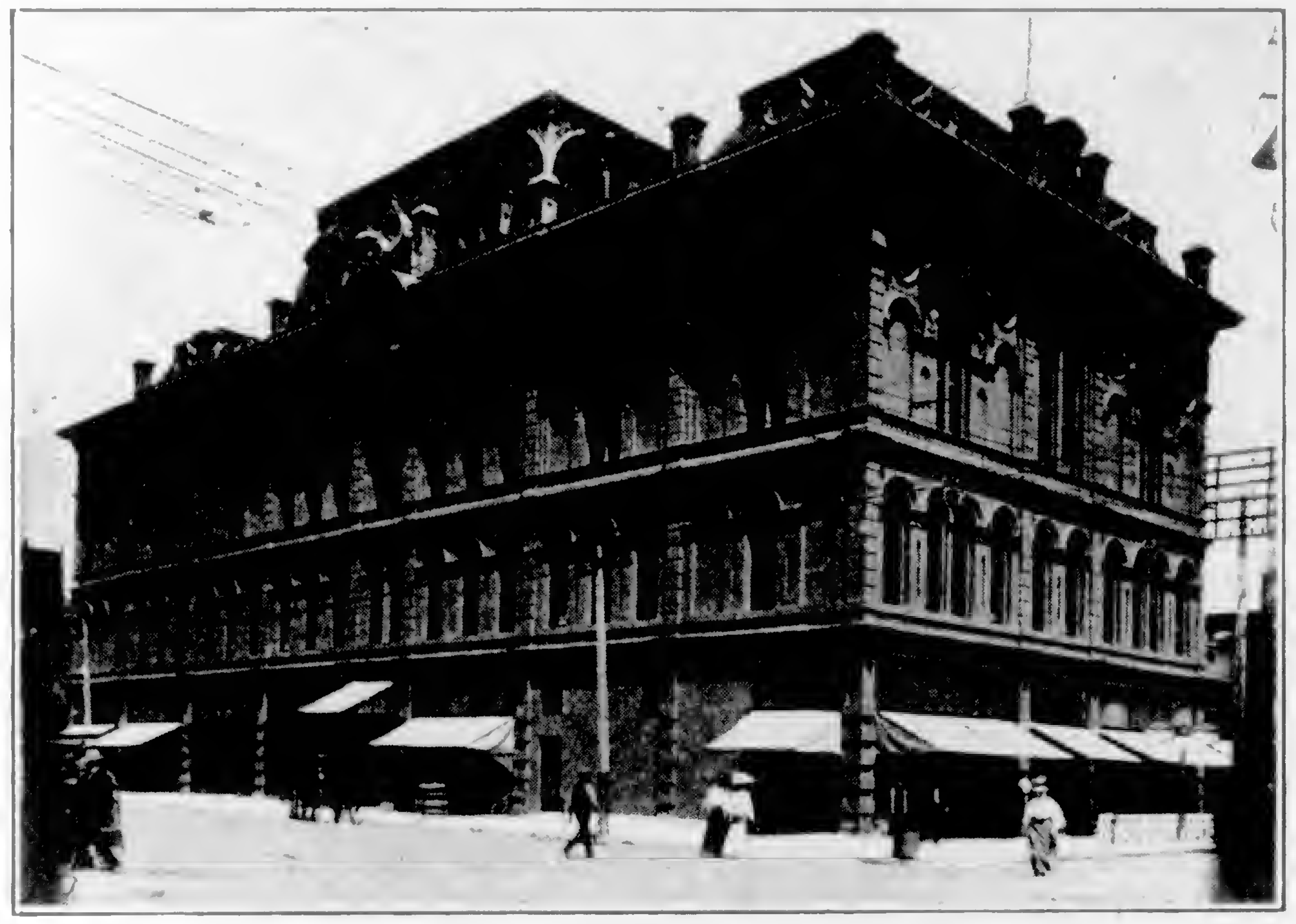
Sacramento Odd Fellows' Temple *Siller Bros., Builders* C-403
Cornice Work by Sinclair & Bessey



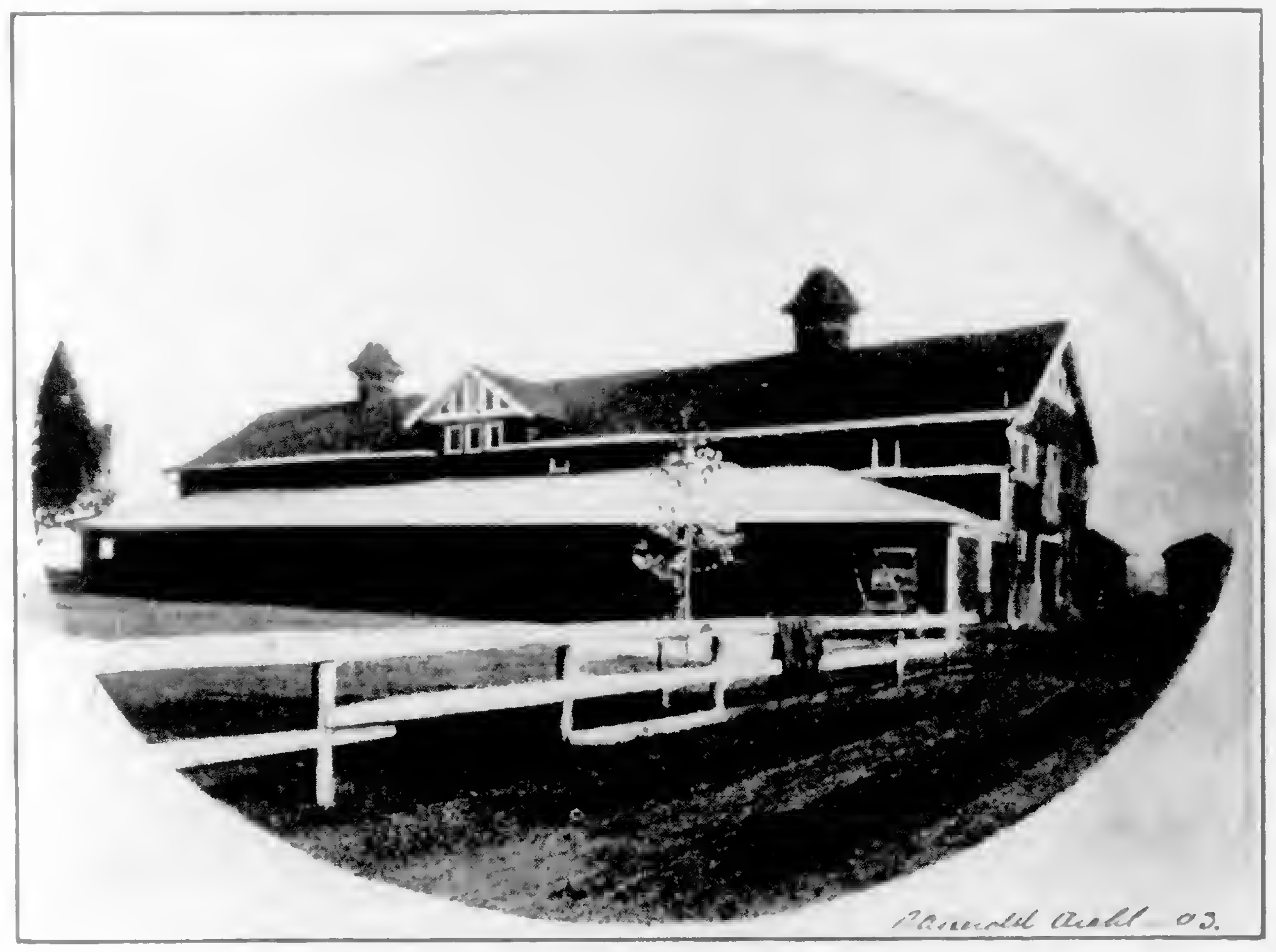
Stable for Buffalo Brewing Company, Sacramento C-404

Keyes Residence, Sacramento *Hook & Son, Builders* C-405
Electrical Work by Electrical Supply Co.

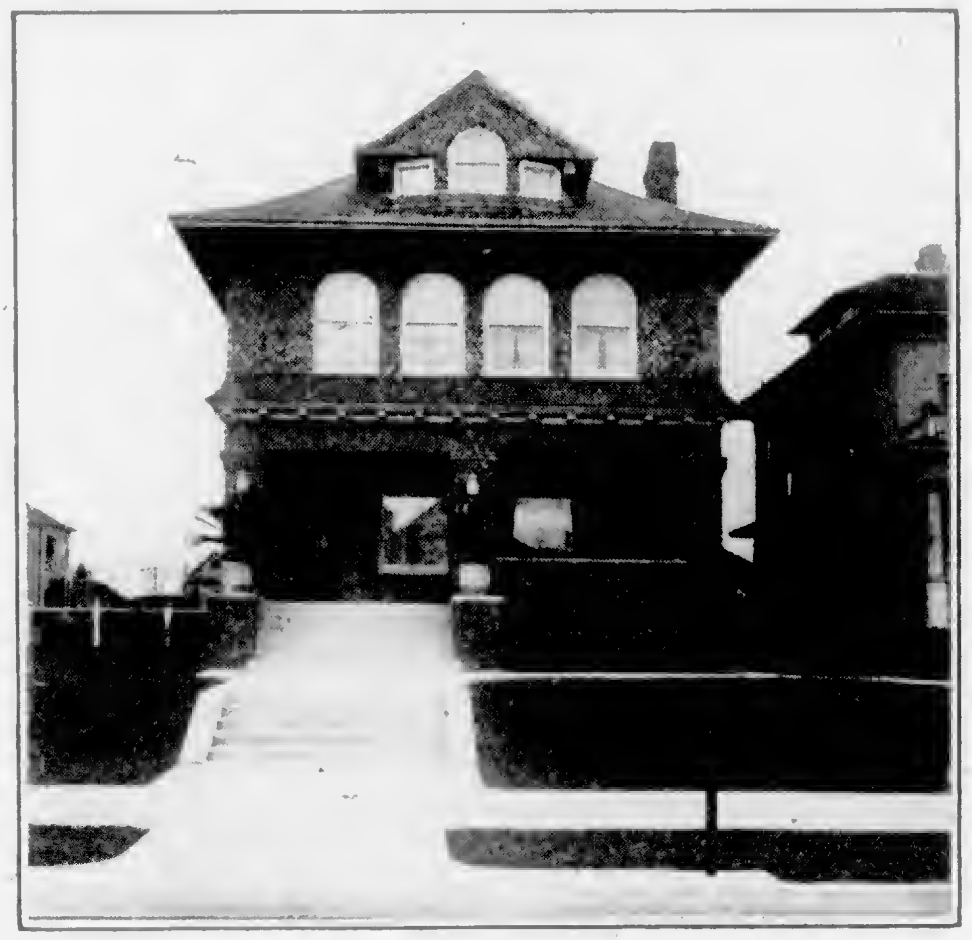
Corner in Living-Room of Keyes Residence, Sacramento C-406



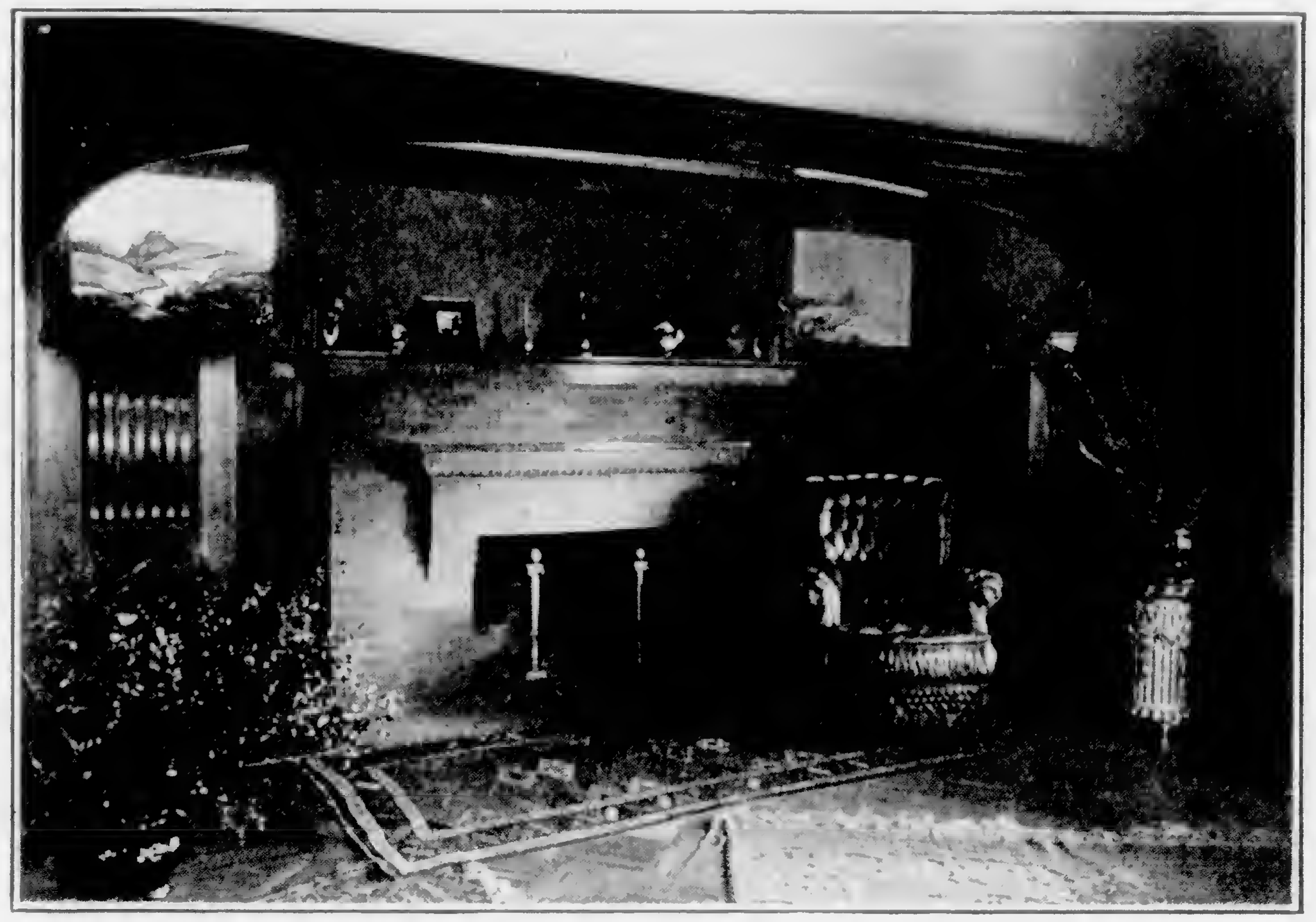
Sacramento Odd Fellows' Temple *Siller Bros., Builders* C-403
Cornice Work by Sinclair & Bessey



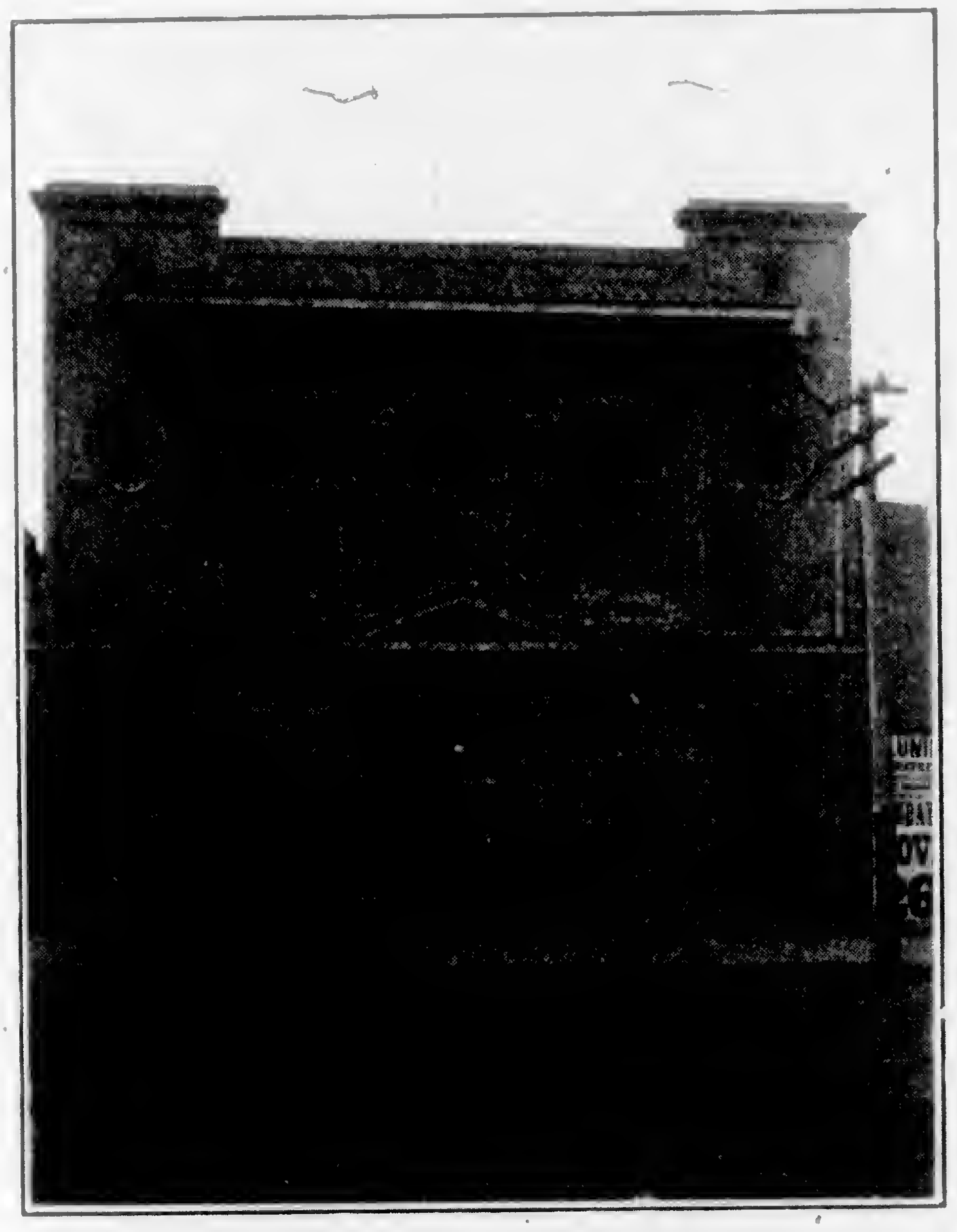
Stable for Buffalo Brewing Company, Sacramento C-404



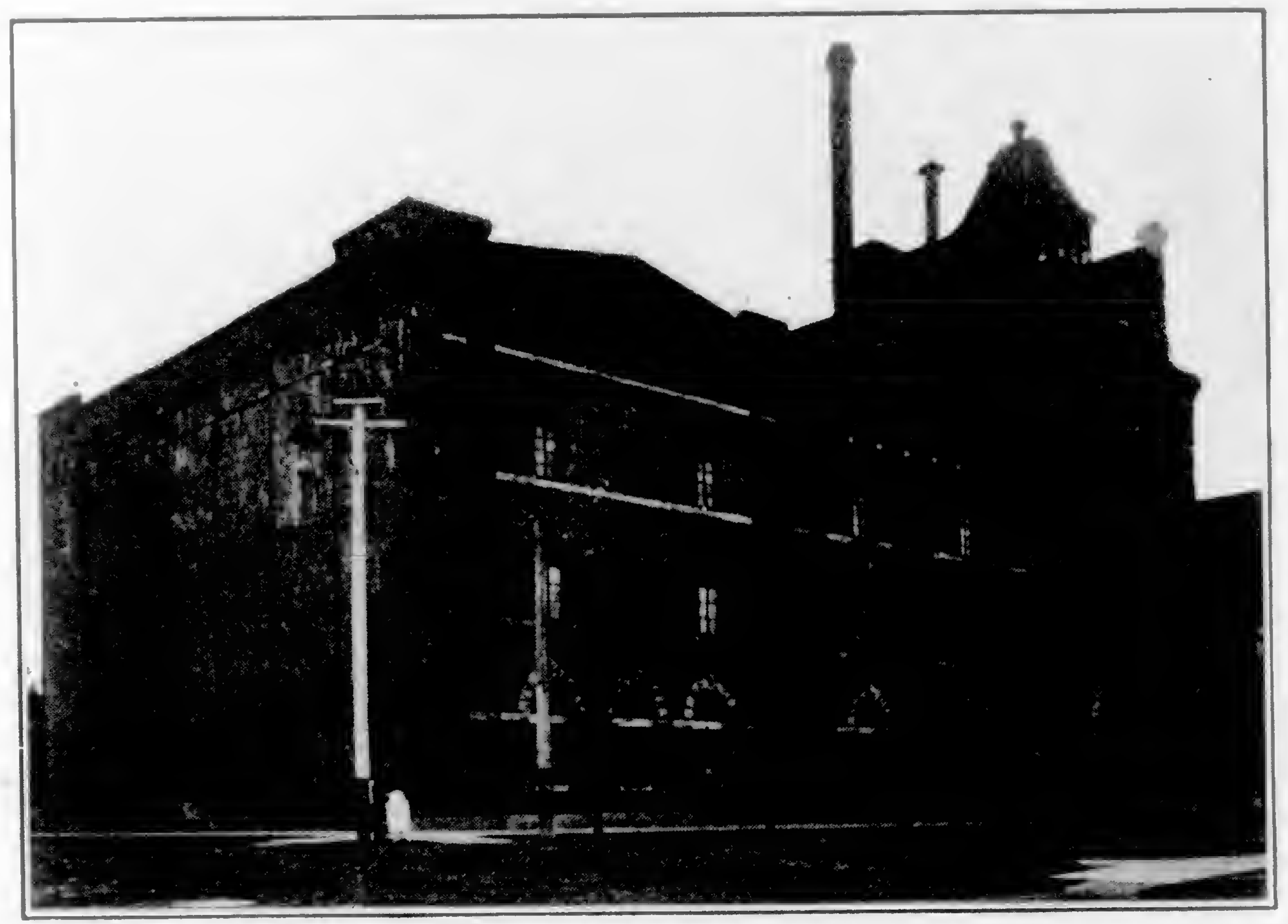
Keyes Residence, Sacramento *Hook & Son, Builders* C-405
Electrical Work by Electrical Supply Co.



Corner in Living-Room of Keyes Residence, Sacramento C-406



Gormley Building, Sacramento *C. J. Mathews, Builder* C-407
J. W. Haley, Brickwork



Storage Building, Buffalo Brewing Company, Sacramento C-408

Heating, Lighting and Electrical Work

System of Ventilation and Heating

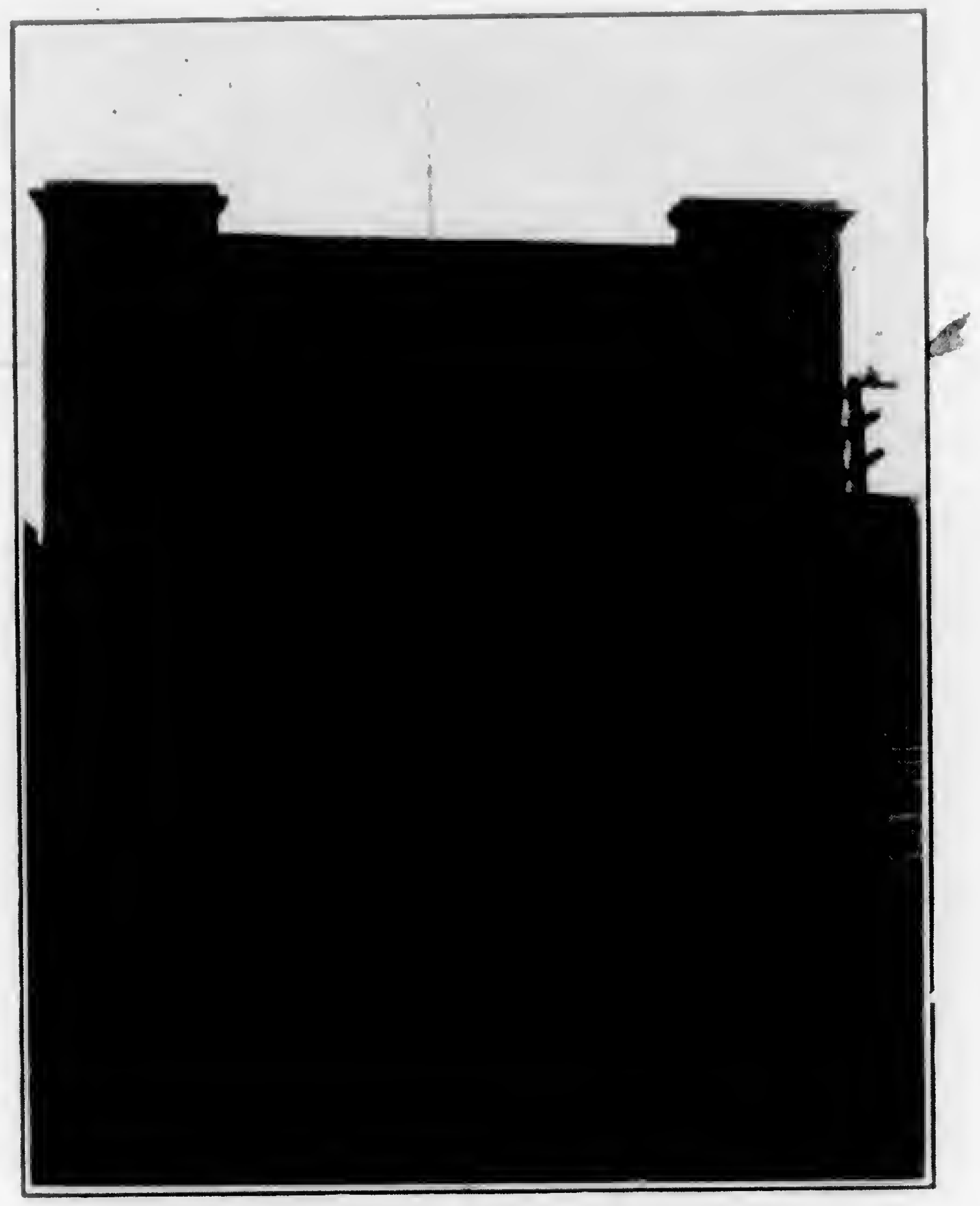
Edited by F. H. BRYANT

THE normal internal temperature of the human body is very near 100°, independent of the temperature of the surrounding air. By respiration the continuous process of slow combustion is kept up,—the oxygen of the air, uniting with the carbon of the blood passing through the lungs, to form carbonic acid. As in any case of combustion, overheating takes place unless provision is made for the distribution of the heat generated, so the body is kept at its normal temperature only by the abstraction of heat from it. The actual heating of the body is not the ultimate object of heating; but in reality, provision is made for the abstraction of heat generated by the vital functions without making too great a demand upon the physical endurance of the individual.

Means of Dispersion of Heat.—Three means are provided for the healthful dispersion of heat from the human body. First, by radiation to the air and surrounding objects. Second, by conducting, principally to the air immediately in contact with the body. Third, by evaporation of moisture from the lungs, throat and skin. Under the conditions of summer air, the last two are generally about equal, but the greater part of the heat is dissipated by the first means. Air is a nearly perfect non-conductor of heat, but radiation takes place through it readily. We may enter a room having a temperature of 75°, with walls at 50°, and feel chilled, simply because heat is rapidly radiated from the body through the air to the colder walls. In comparatively dry air equality of temperature is kept up by a steady but imperceptible evaporation from the skin. In moist air this rapid evaporation is prevented and the water is deposited as perspiration, the air being too heavily laden to take it up. On the other hand, when the air is in motion it increases both evaporation and conduction by the constant bringing of fresh air to take the place of that already moistened or heated. If, under any circumstances, one of these three means fails to abstract heat rapidly enough, the removal by the other means is increased, and equilibrium of temperature kept up.

High humidity has the effect of modifying very materially the temperature at which comfort may be secured. The excessive humidity of the atmosphere of the west and south of England has, owing to the reduced evaporation from the body, the effect of making a temperature of 56° in that country equally as comfortable as 80° in the dryer climate of Canada or Minnesota.

In this country, where some means of heating is usually required during about seven months of the year, the amount of heat necessary and the economy exercised in supplying it are vital questions. As will appear in what follows, convenience and economy can best be assured by an intelligent union of the heating and ventilating systems.



Gormley Building, Sacramento *C. J. Mathews, Builder* C-407
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Storage Building. Buffalo Brewing Company, Sacramento C-408

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A Chapel at Sacramento C-409

Natural Methods.—The requirements of good ventilation and heating being understood, the choice of the best methods for carrying out such requirements presents itself. While the principles have been generally understood, their application has proved to be the stumbling-block over which many an architect and engineer has tripped. Natural agencies, as apparently the least expensive, have usually been first called upon to produce such currents and move such volumes of air as might be required. But it will be universally admitted that all systems of so-called "natural ventilation" have proved themselves inadequate to fulfill all requirements. A dependence upon windows and doors for ventilation cannot with propriety be called a system of ventilation for the supply is ordinarily spasmodic, and without question, disagreeable, except in so far as a cold draught of fresh air from an open window may be preferable to the vitiated and odorous air of a confined apartment. Excellent results may continue for a number of days during the employment of a method of ventilation dependent upon natural agencies, but a change in the temperature or humidity, or in the direction and force of the wind, may exactly reverse the action of the system. Flues which were designed to furnish fresh air will be found to be actionless, while foul-air ducts may be bringing the foul air from other rooms. For a crowded or continuously occupied apartment, such arrangements are utterly inadequate and are certain to prove entirely unequal to the task of supplying air in such quantity as has been shown to be required,—above all, they are not positive.

Ventilation by Aspiration.—Somewhat more positive results may be obtained by warming the air within the vent flues. Gas jets, steam heated surfaces and the smoke flues from steam or hot air furnaces are employed for this purpose. But as the results attained are due to a lessened density of the air within the flue, and as the heat applied for thus warming and rarifying this air serves no other useful purpose, but is dissipated in the atmosphere, the method proves to be excessively expensive when the power, as measured in heat units, required to develop this movement is taken into account.

Forced Circulation.—In the system of forced circulation by means of that universally adopted machine—a fan or blower—the action is **absolute** and **positive.** The whole matter cannot be better expressed than in words of the late Robert Briggs, a man of large experience in practical ventilation and heating: "It will not be attempted at this time to argue fully the advantages of the method of supplying air for ventilation by impulse through mechanical means,—the superiority of forced ventilation, as it is called. This mooted question will be found to have been discussed, argued and combatted on all sides, in numerous publications, but the conclusion of all is, that if air is wanted in any particular place, at any particular time, it must be put there, not allowed to go. Other methods will give results at certain times or seasons, or under certain conditions. One method will work perfectly with certain differences of internal and external temperatures, while another method succeeds only when other differences exist. One method reaches to relative success whenever a wind can render a cowl efficient. Another method remains perfect as a system if no malicious person opens a door or window. No other method than that of impelling air by direct means with a fan is equally independent of accidental natural conditions, equally efficient for a desired result, or equally controllable to suit the demands of those who are ventilated."

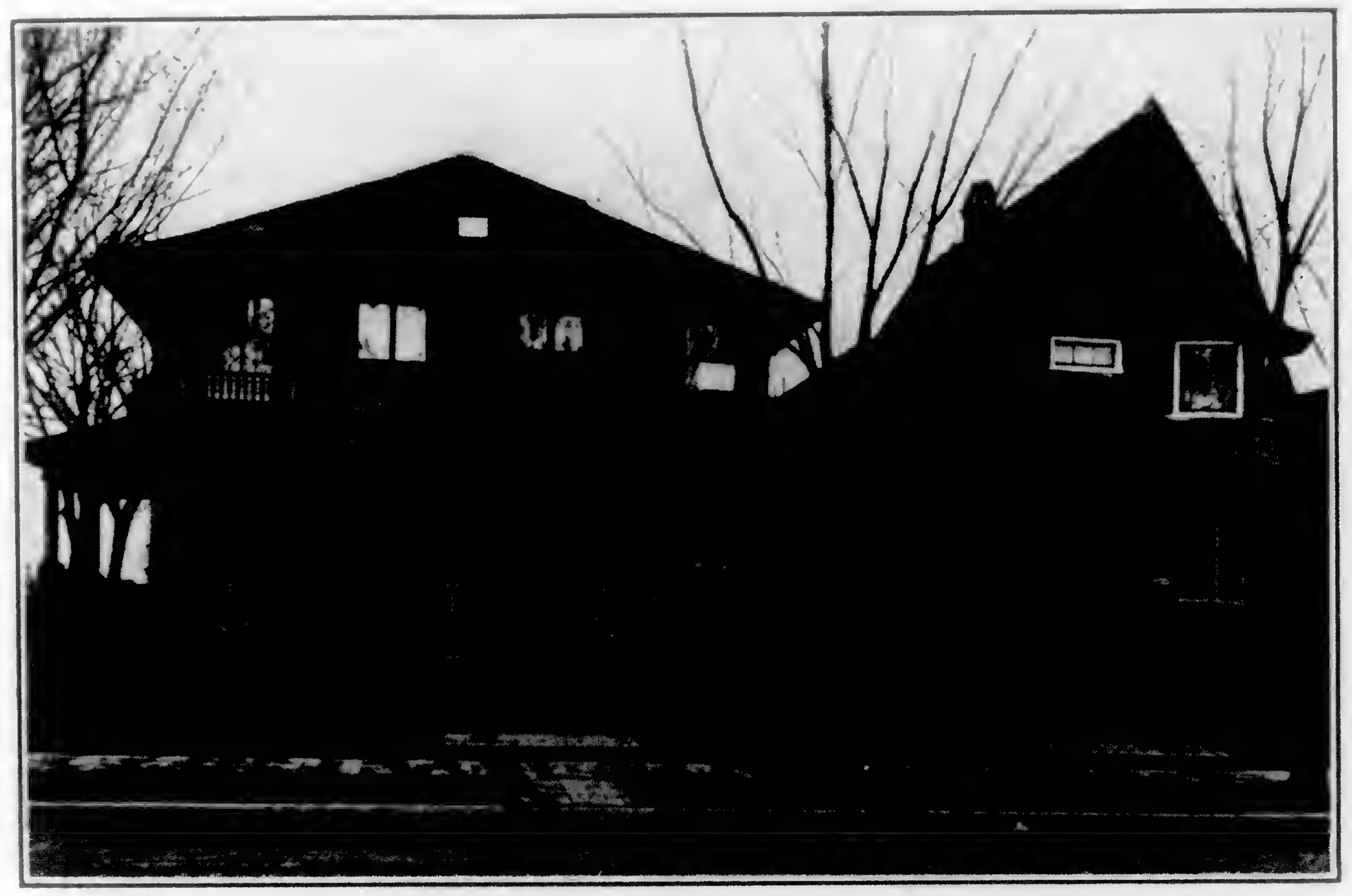
Efficiency of the Fan.—"In all mechanical appliances that is simplest which most positively and directly effects the purpose in view; and in this matter of supplying air, it may be claimed that the process of impelling it when and where wanted is at once the most certain and efficient, and that the fan (in its forms of a rotating wheel with vanes for large uses) is the simplest and readiest machine for impelling air. It will not be attempted at this time to discuss the theory of rotary fans. The fan itself will simply be accepted as one of the recognized appliances in the construction of ventilating apparatuses available with other mechanisms in established forms and defined types of American practice."

After showing the enormous expense of moving air by allowing it to pass over steam-heated surfaces (thus creating a difference in pressure due to a difference in temperature) compared with the expense of moving equal quantities of air by means of a fan, among the many mechanical devices for the movement of air through channels, none are so economical of power and convenient in use as the fan.

A practical illustration will best serve to prove the force of this statement. A vent flue, one square foot in cross sectional area and 40 feet high, is arranged to withdraw air from a room having a temperature of 70°, while the outdoor air is at 20°; the flue being provided with an accelerating coil, which heats the air within to 90°. By the ordinary methods of calculation it may be shown that the theoretical velocity of the air thus produced in the flue will be 1,149.4 feet per minute, and that there will be expended for its movement 394.6 heat units. A fan, on the other hand, would theoretically require, to produce the same air movement, only .703 units of heat. But these figures are purely theoretical, and the efficiency of the two methods must enter to give the true relation.

Assuming for the flue an average efficiency of 60 per cent, there will actually be required for this method 657.7 units of heat. On the other hand, making the fair assumptions that of the heat units in the fuel 70 per cent is

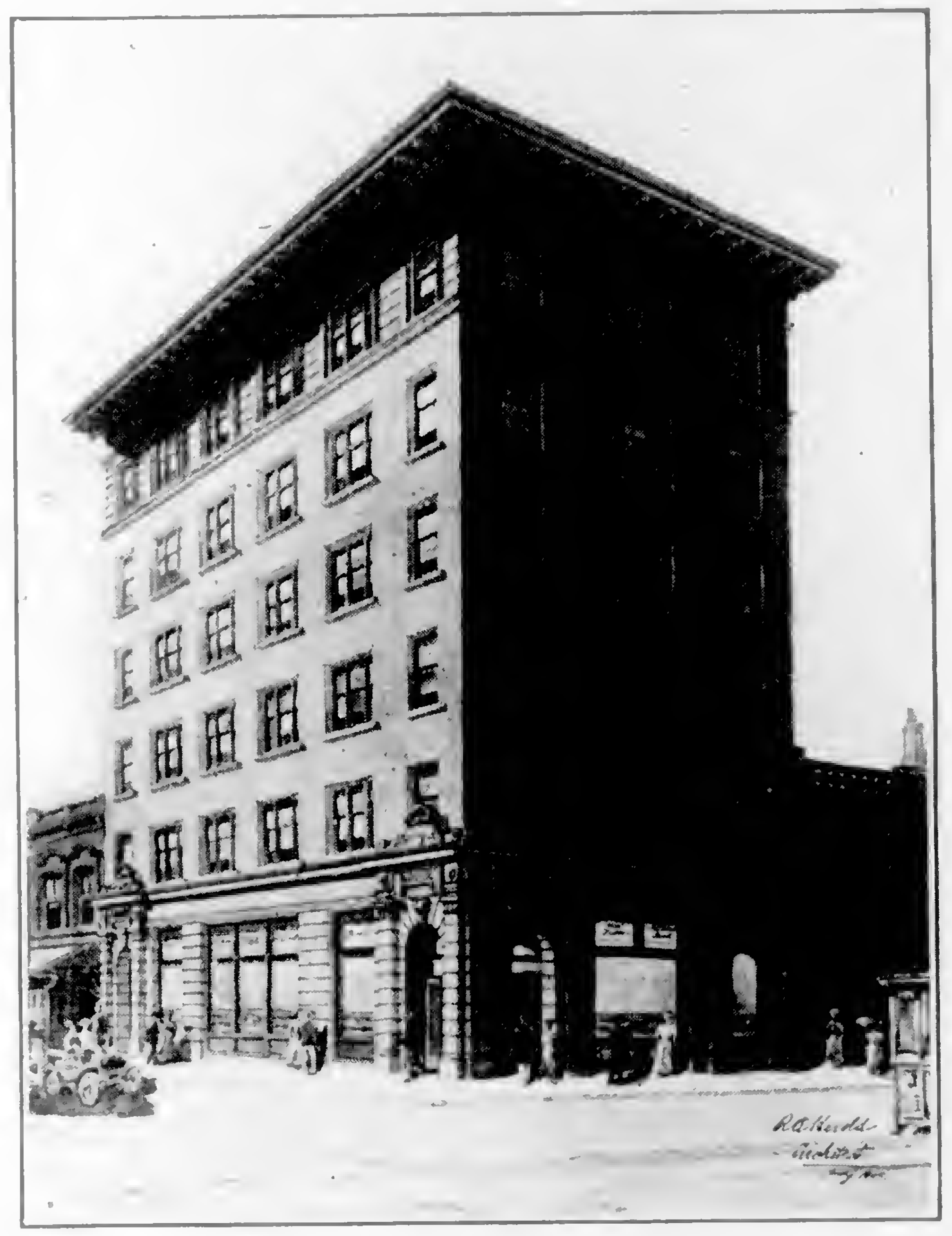
The Bryte Building, Sacramento
Concrete Work by Adolph Teichert C-410



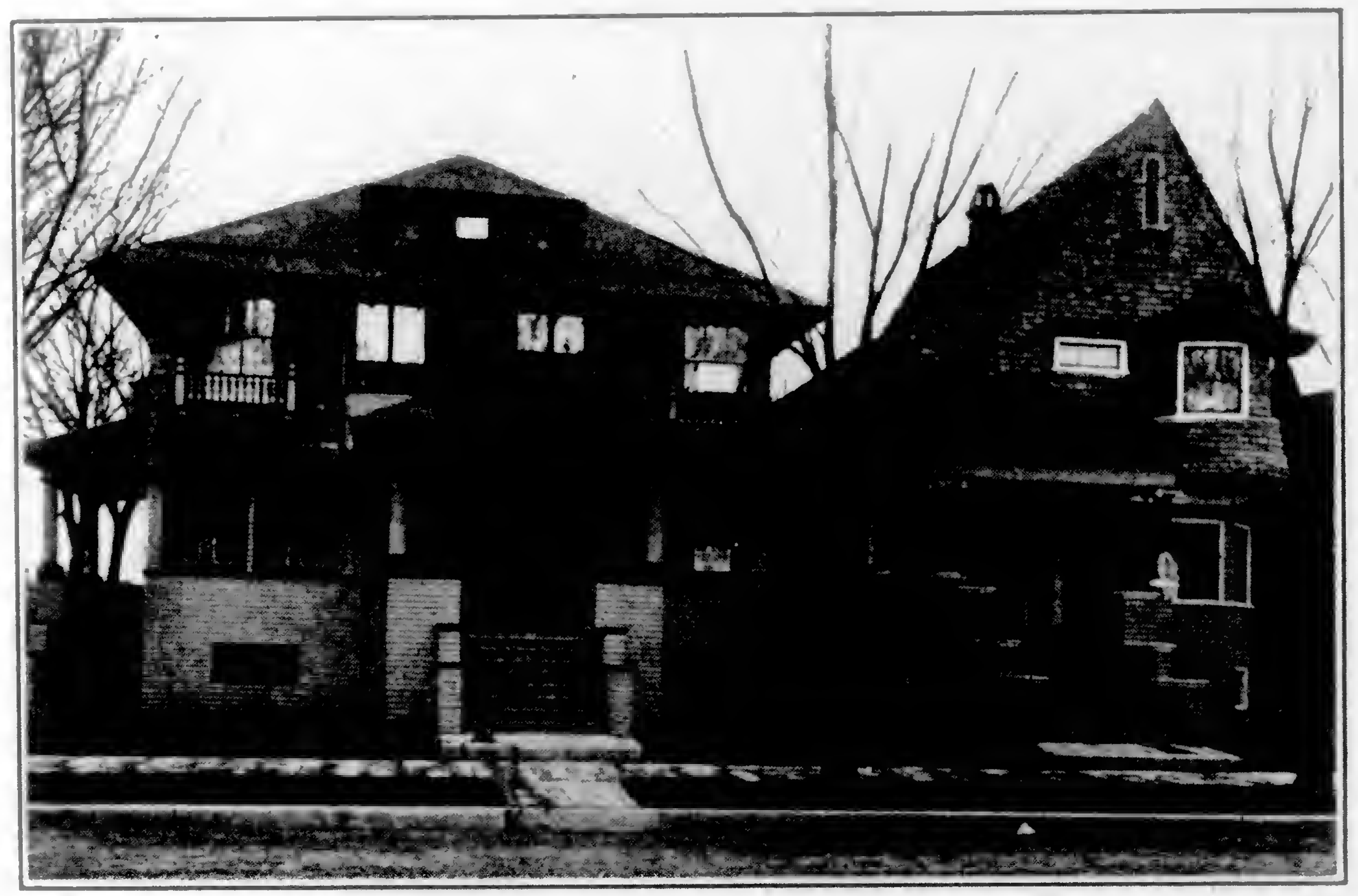
Two Sacramento Cottages *A. W. Smith, Architect* C-411
Millwork by Sacramento Planing Mill

Fox Residence, Sacramento *John W. Haley, Brickwork* C-412

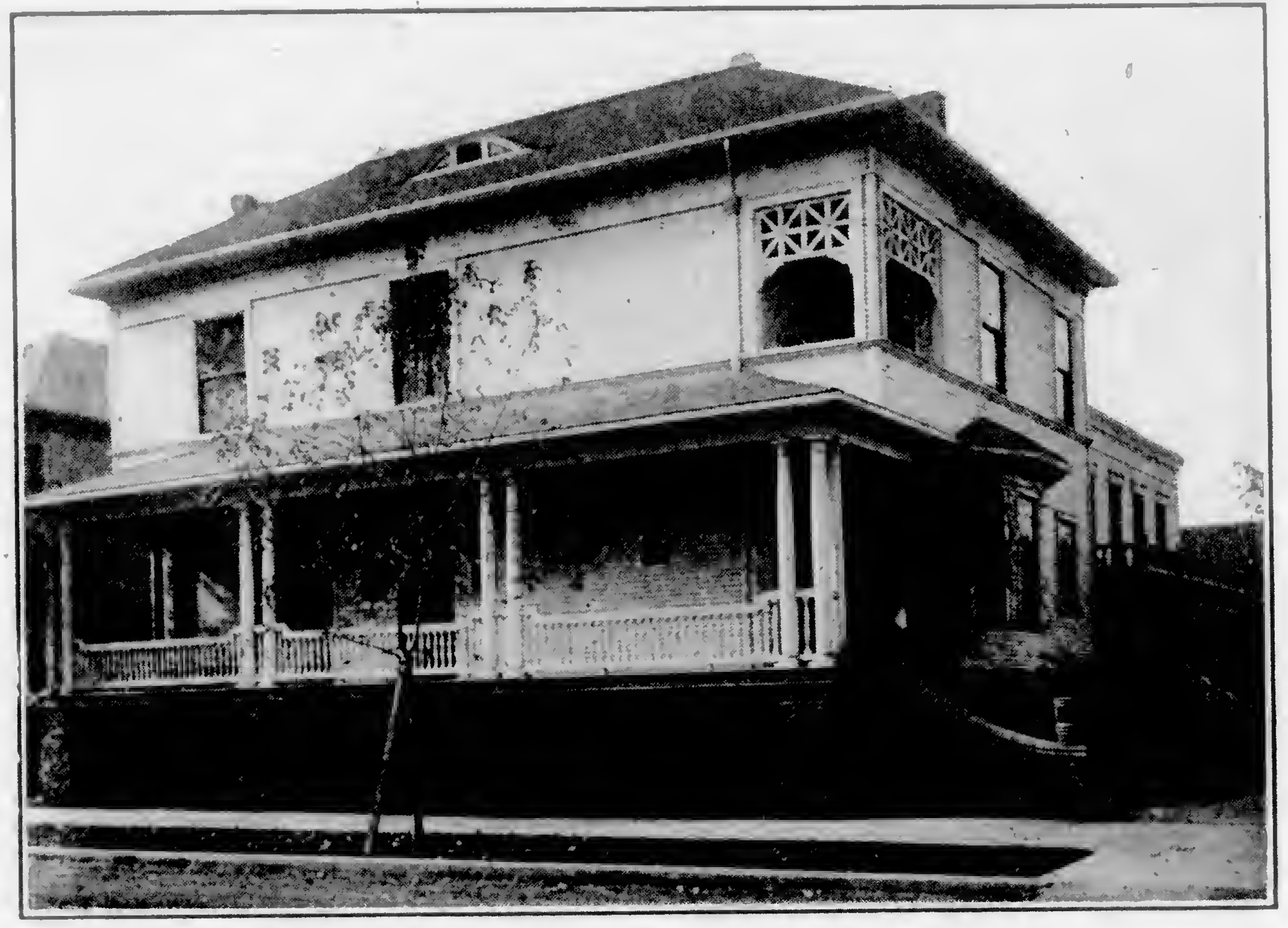
Corporation House, Sacramento *C. J. Mathews, Builder* C-413
Brickwork by Geo. L. Herndon



The Byyte Building, Sacramento C-410
Concrete Work by Adolph Teichert

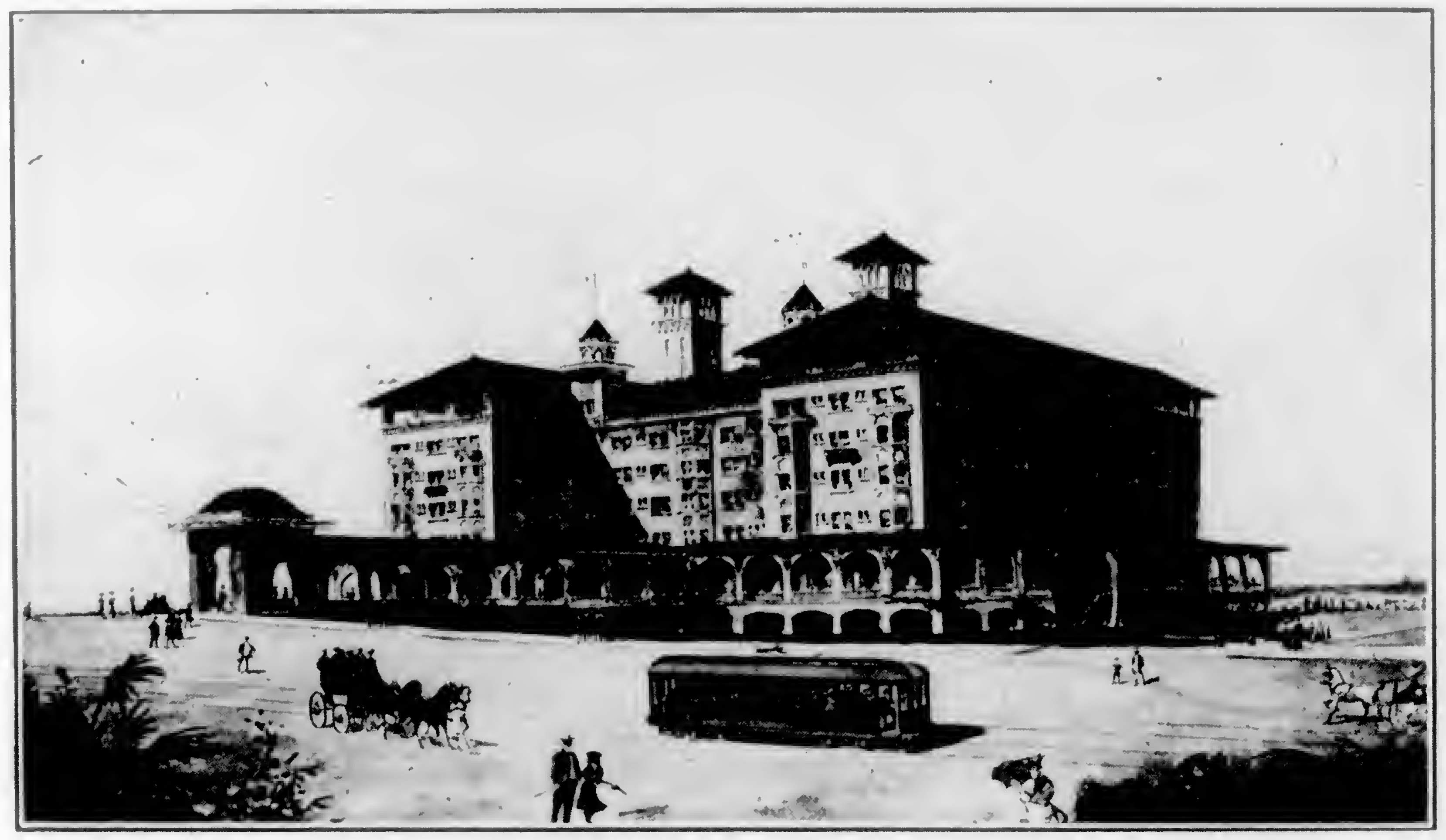


Two Sacramento Cottages *A. W. Smith: Architect* C-411
Millwork by Sacramento Planing Mill

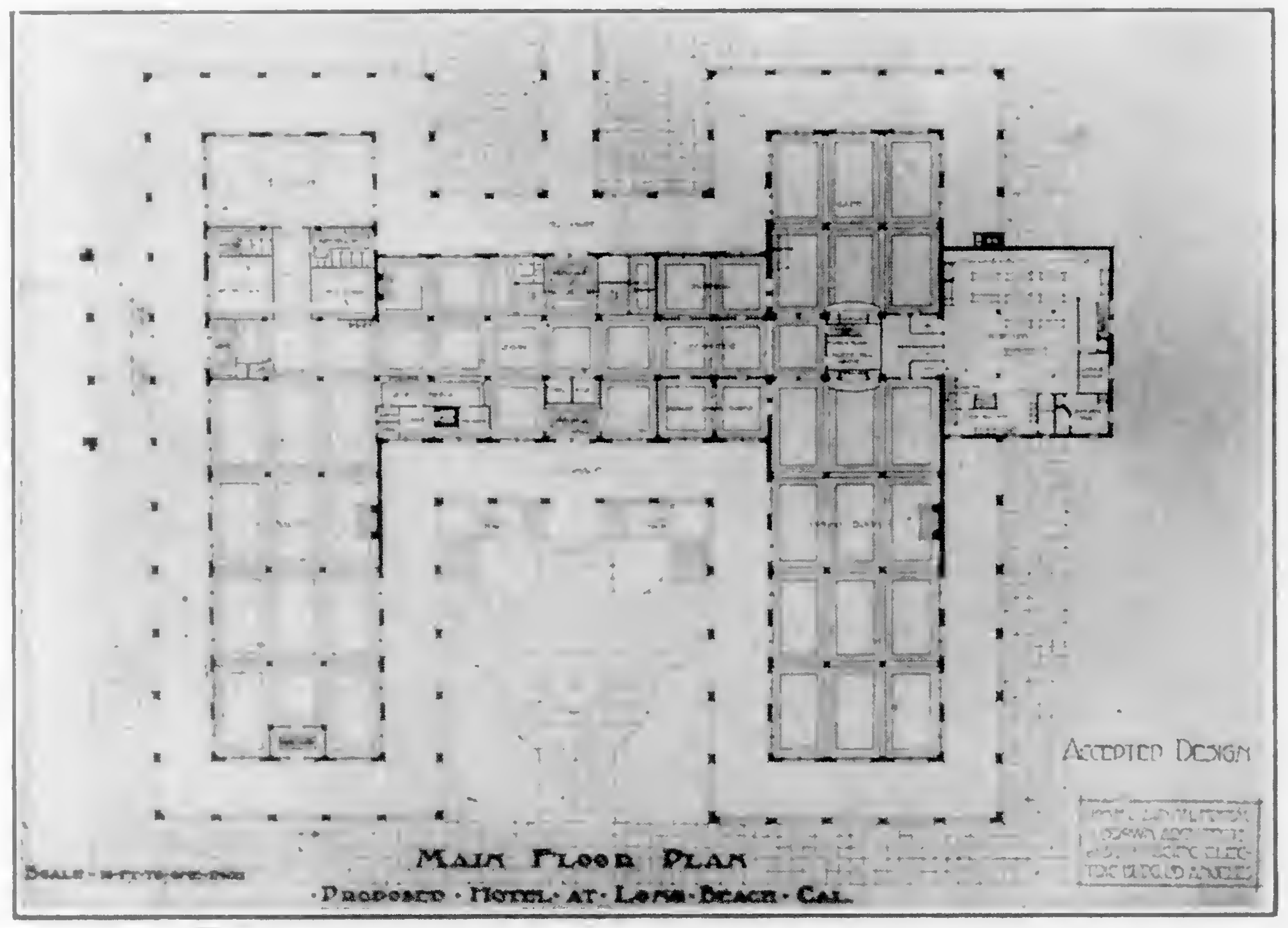


Fox Residence, Sacramento *John W. Haley, Brickwork* C-412

Corporation House, Sacramento *C. J. Mathews, Builder* C-413
Brickwork by Geo. L. Herndon



New Bixby Hotel, Long Beach *Austin & Brown, Architects* C-414



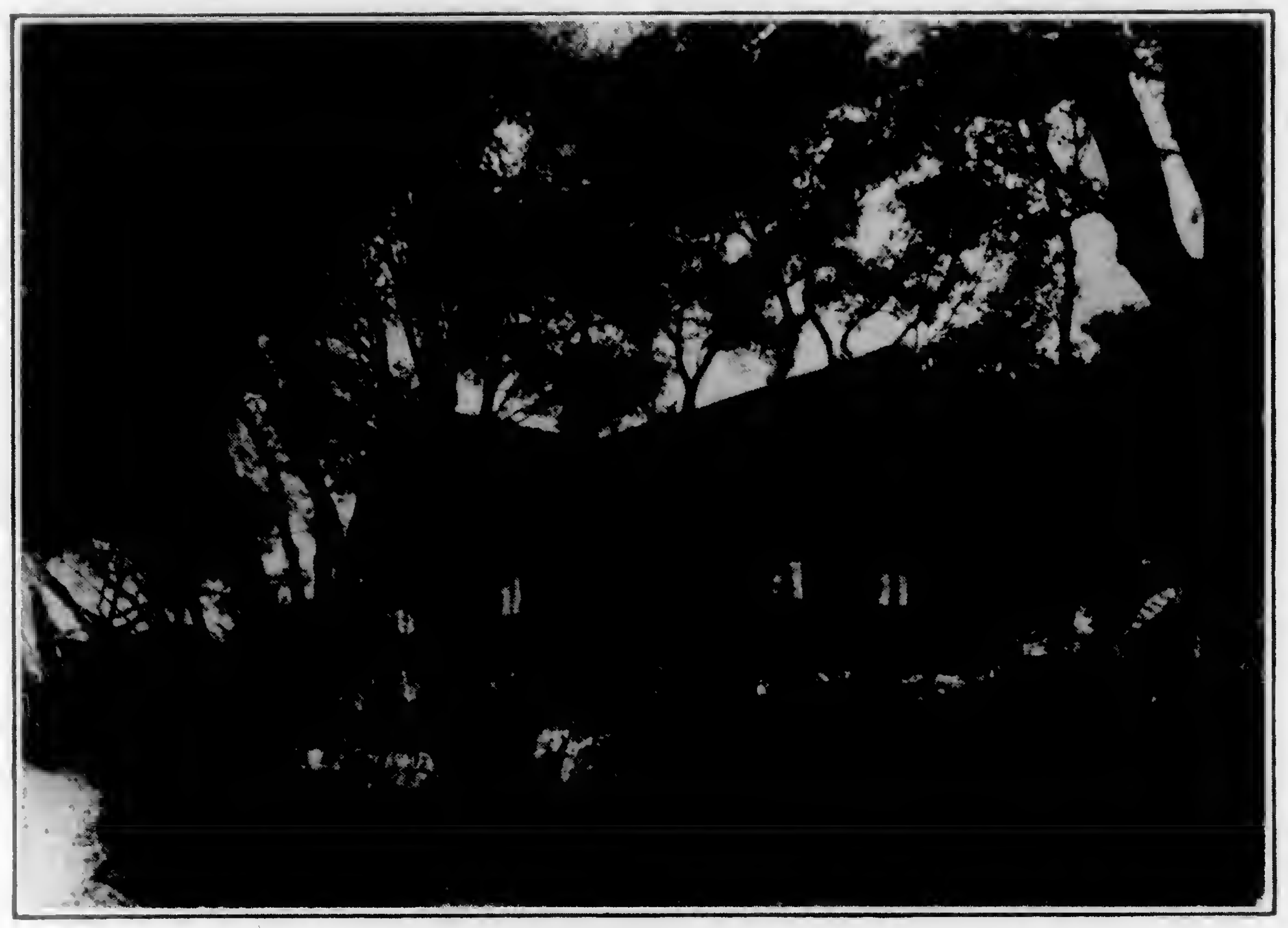
Austin & Brown, Architects C-415

delivered in the form of steam, that this steam is utilized in an engine having an efficiency of only 10 per cent, while the fan driven thereby turns into useful work only 25 per cent of the power delivered to it by the engine, the combined efficiency of the system will be reduced to 1.75 per cent, calling for a heat expenditure of 40.17 units. Even under this practical condition it appears that the movement of air by aspiration still requires 16.37 times as much heat (which is simply a measure of the coal bill), as a fan producing the same results. Of course a change in the conditions will affect this relation to a reasonable extent, but it is certainly evident that the thermal or aspiration system requires more fuel than the fan under all practical conditions as they exist in any system of heating and ventilation.

* * *

No Evidence of Insanity

IT IS to be regretted that the poor lady who bequeathed her property for the erection of a Gothic structure in a central part of London (which was to be a joy forever) was declared to be of unsound mind, memory and understanding. It is of such rare occurrence for any one to dream of creating a work of the kind, if the will had been carried out in a satisfactory manner other people might be disposed to imitate the testatrix. Miss Lina Beatrice Clayton-Browne, whose will came before the courts on Saturday last, died on March 24, 1904, in her thirty-second year. In August, 1900, she had a will drawn up while staying in Windsor. In it she directed that after the payment of an annuity "the whole of the trust fund and the accumulations of income thereof were to be applied in the erection, without buying land, of an ornamental structure of Gothic design, such as a market-cross or street-crossing refuge in the style of a market-cross, tall clock, street-lamp stand, or all combined, in a central part of London, the plan whereof shall be offered for open competition and ultimately decided upon by the Royal Institute of British Architects, and I especially desire that no inscription of my name shall be placed on such erection. In connection with the construction of the said Gothic erection I would wish that no large masses of dark metal, such as dark bronze or cast-iron, or of dead white marble or alabaster should be used, whether as statutes or otherwise, as I consider the effect of such large masses to be toneless and blurred, particularly in a moist climate. I should also like no pigment to be used upon any but an absolutely flat surface, and then but sparingly. In deciding upon the merits of the designs, I should like particular value to be laid upon the general outline as seen from a good distance. I should like to be inscribed upon the structure in letters of a different tincture to that of the ground, such as bronze letters in marble or stone, the following inscription: 'Many and munificent are the gifts ministering to the ills of the flesh, therefore is this structure dedicated merely to the more neglected gladdening of the eye.' 'A thing of beauty is a joy forever.' . . ." If the words were not those of the lady herself, there is no question that her intentions were expressed in it, for the solicitor stated she gave him instructions in an exceedingly sensible manner. The value of the estate was about £12,500. Various acts were proved which were sufficient to show that on other occasions the lady's mind was affected. The President of the Probate Court was satisfied, from the evidence, that he must pronounce against the will, and a central part of London has therefore lost an ornament.—The Architect.



Ross Valley Home of C. A. Meussdorffer, Architect C-416

Suburban Residence of Dr. F. J. Hund, Ross Valley *C. A. Meussdorffer, Architect* C-417

Damp Resisting Compounds

By HARRY LARKIN

THE tendency of brick, terra cotta and certain characters of stone to absorb water is the cause of considerable annoyance and has led to the introduction of a number of compounds claimed to prevent entrance of dampness through walls built of these materials. The question of dampness entering a wall is of vital importance now that steel is so largely used to carry the weights. The walls of all steel framed buildings are built light and unless some provision is made to keep the dampness away from the structural steel, there is sure to be trouble in time that will cause our sky-scrapers to wilt away. As an illustration, the Alto Building, at Bush and Kearny streets, was erected three years ago and the southerly wall was coated with three coats of a white paint on the outside in hopes of making the wall water-tight.

Last winter the writer was called in to pass judgment on the matter and found the painted walls of the halls along-side the southerly wall blistered from the dampness and the position of each steel column in the wall was indicated by rust marks from the ceilings to the floors. When the winter was over, the outside of this southerly wall was coated with "Pabco."

The building occupied by the Cordes Furniture Company on Geary street is solid brick walls, without structural steel, but dampness has entered at the various floors to such an extent that the tinting is ruined from the roof down.

All of these recently introduced damp proof compounds are claimed to leave a surface that will hold plaster. If such is the case, it will be a simple matter to coat exposed walls and plaster over the damp proof course in order to cover the objectionable color. Coating the back side of face brick would in a great measure keep water from entering the wall.

Asphaltum is the base of all effective damp proof compounds, so where there is important work in the water-proofing line to be done, it is best to rely upon the original material itself and not pay for some fancy name or take the chances of adulteration. Straight asphaltum can be adapted to any work a damp proof compound is claimed to do and accomplish the result without question of permanency. Nothing is saved in the cost by plastering directly on to brick walls coated with a damp proof compound in the interior of a building. To be sure the furring and lathing is done away with, but the carpenter is put to great additional expense in securing his casings, base and wainscot. Besides there is grave question as to whether the plaster will bond itself sufficiently to be permanent. It does not stand to reason that a compound will not absorb water and still make a bond with plaster. Even plastering onto rough brick surfaces is none too secure a job, with all the close adhesion of the two materials. However, if these compounds do make the bond they claim, they are invaluable in brick construction. But in my opinion it will take a few years' time, together with a few of our earthquakes, to fully demonstrate the question.

STREET PAVEMENTS.

No one disputes the fact of improvement made in changing the pavement of Third street to basalt blocks set on a concrete foundation and grouted with asphaltum and gravel. There is a question whether any other character of wearing surface would stand the heavy usage this street has, and the noise is noticeably less than on the old style basalt pavement. Improvements have been made in each job of this character that have been laid and the wear the pavements on parts of Fourth street and the length of Third street have stood, demonstrates that a suitable pavement has been found to fit the conditions in the business section of the city.

Bituminous Rock pavements, laid with reasonable care, give good service in the residence districts where the grades are moderate. Laying the center of the street with basalt blocks and the edges with bitumen, provides a means of ascending a considerable grade that bitumen would not permit.

The asphalt mastic pavements, so common in other cities, will never come into general use in San Francisco, on account of there being no sufficient supply of sharp sand and gravel needed in laying them. Los Angeles and Portland are two cities on this Coast particularly blessed with an ample supply of sand, grit and gravel and as a consequence have pavements of asphalt mastic giving excellent service, as well as being clean and sanitary.

* * *

Signing Architecture

WHATEVER may be the case in the old world, which gives a thought too much regard to graphic artists, in this country, in fact, on this continent, the architect is the leading figure. The names of prominent architects are well known, not in their own city only, but throughout their own country and beyond it. It is questionable whether any architect in the history of the world has ever been so widely known, in his own generation, to a general public, as is, at the present moment, Mr. Daniel H. Burnham. This is partly due to the widening of the architects' sphere, and in Mr. Burnham's case, to a celebrity gained by his successful conduct of the building operations of the Chicago Exhibition, continued by his connection with the Washington improvements project, and by the frequency with which he is applied to now tor advice by cities that are devising improvements in their plan. But while these large dealings naturally attract attention, so that the newspapers mention Mr. Burnham's name with the same simplicity as they would a general's, in full confidence that every one will know who he is, there are architects who are not architects of cities but only of buildings, who are almost, if not quite, equally well known. Building is, in fact, going large nowadays; a single structure may be an important addition to any city, and this importance naturally gives the architect a new interest for the public. The interest spreads to the smaller designers, partly as members of the same profession but partly for another reason—the new importance that is attached by the mass of the people to their houses, since it has become as easy to own as to rent. Indeed, in some places in Canada it is more easy to own than to rent; for speculative builders build only to sell and will not rent. This state of affairs has brought about a widely spread domestic sentiment which is acting as a wholesome counteragent to the idea that life in a flat, without housekeeping or other responsibilities, is the American woman's due. The use in the United States of the pregnant word "home" instead of the simple word "house," irritating as it is when used on all occasions, marks how this sentiment has grown and how (which is our present object in noting it), the interest taken in small houses has become attached to their architects.

Even the press is not without signs of abandoning its tradition of ignoring the architect in its notice of buildings. The editors of the daily papers are still as sensitive to a "free ad." as they are to a typographical error, yet the names of the architects of projected buildings are always mentioned under the cuts of the buildings which are so frequently inserted now in the newspapers.

This growing interest in architects is a mark of awakening recognition that architecture is an art. This—it being the truth—is a good thing to have recognized. It is to the advantage of everybody that the recognition should be furthered in every possible way; and one way which has been frequently proposed is that architects should sign their buildings. In speaking of it recently, in a presidential address to the Architectural Association, Mr. Guy Dawber said that the signature of buildings is a custom on the continent. That it is not unknown in England may be seen on the terra-cotta face of a hotel building in Piccadilly, where the signature of Messrs. Ernest George and Peto, architects, appears as a conspicuous corner decoration. When one sees a signature, placed thus in a prominent position, one becomes seriously aware that it does not make for benefit to the architect unless he has done well. The proceeding clearly has a double side—both working for good; that the art of architecture should be exalted in the eyes of the public, and that the architect's sense of responsibility should be kept alert. When an architect did his work under a cloud of oblivion; paired off with the plumber in building operations, as equally undesirable and only not so necessary; it required stout and enduring character and conscience not sometimes to sink into a state of indifference and compromise. It is hard to uphold the fine thing against its neglect. It is hard to uphold an art alone. Indeed—as art that is alive always gets its living quality by expressing the life of its time, and only pedantry or eccentricity comes from the secluded artists—the more the architect is in touch with the world the better for his art.

The growing interest in architecture and architects is wholesome, and if it is assisted by a movement towards signing buildings it will be a good thing. It is quite likely that no formal assistance will be needed to such a movement, but that a custom so much in accordance with the general feeling of this time of Renaissance will arise, as customs do arise, all at once, everybody apparently following everybody else.—Canadian Architect and Builder.

* * *

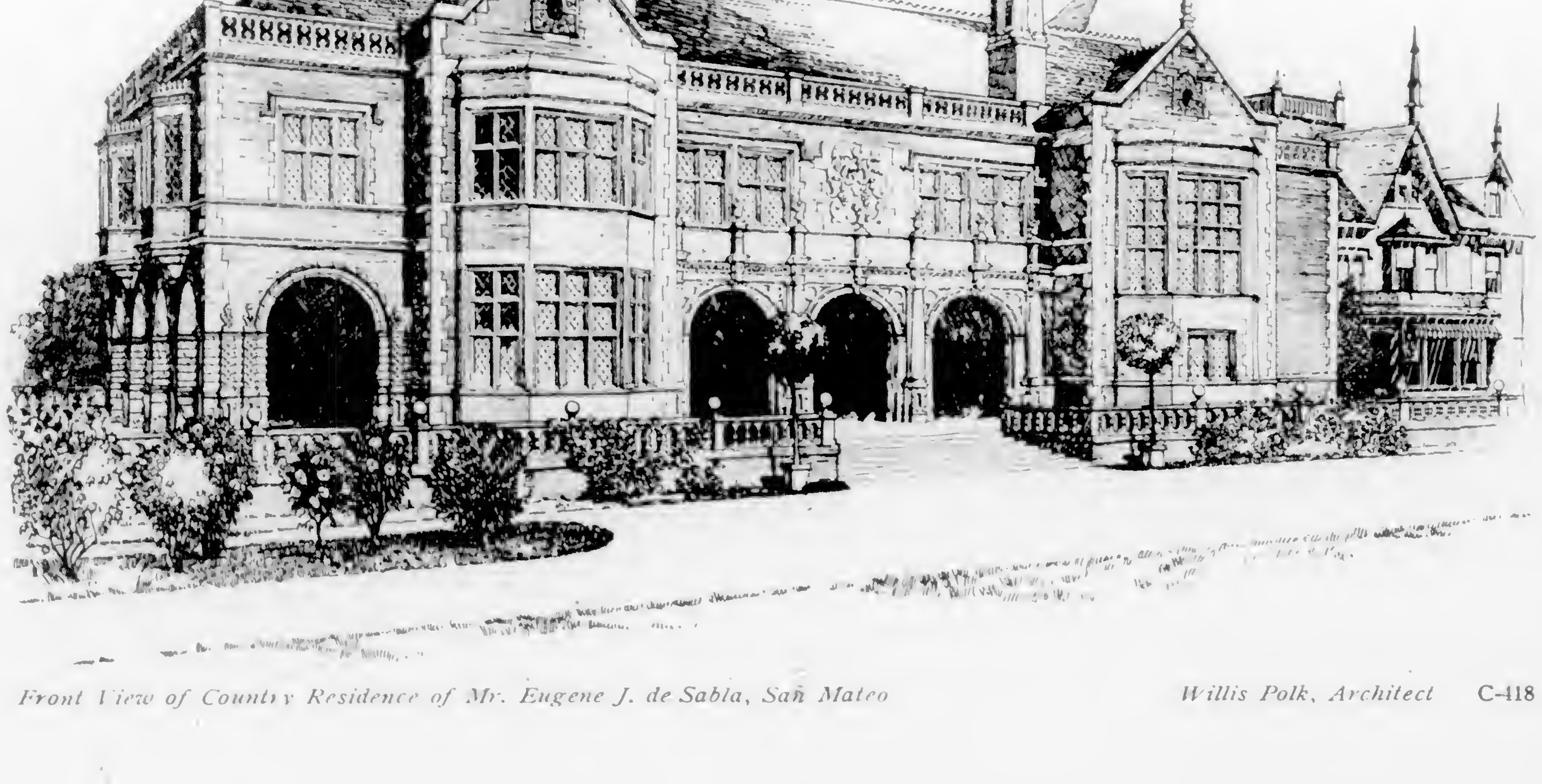
Apartment-House Construction

ONE of the most remarkable features of the building operations in Chicago for the past year is the amount of apartment-house or flat construction, which has been carried on on a scale of unprecedented magnitude.

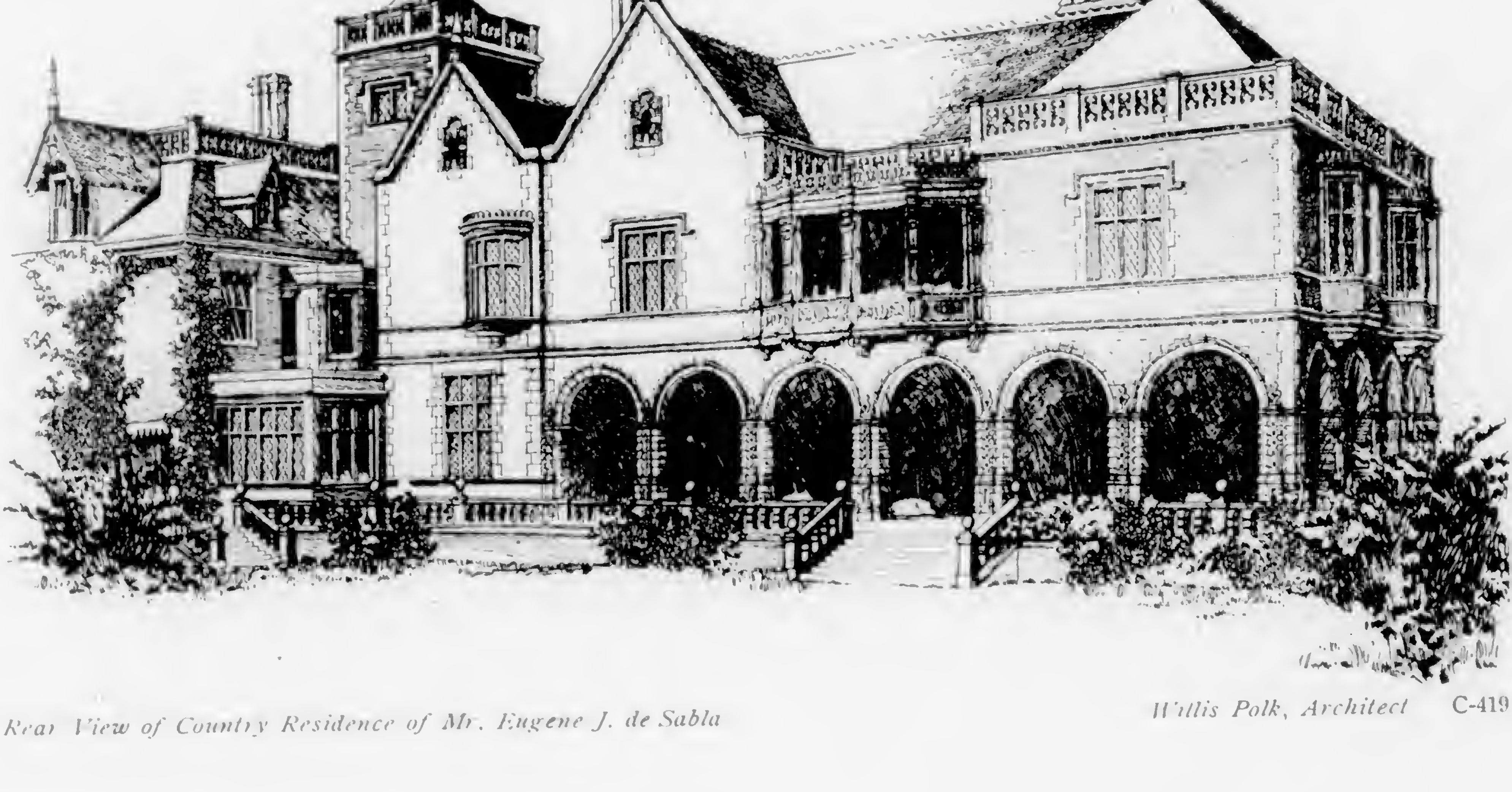
It had been thought that flat building in Chicago was overdone, and when in 1904 the total of the year's operations reached over $14,000,000 compared with $7,000,000 for 1903, it was expected by many that a slump would surely come and the figures for 1905 would show a considerable falling off. So far, however, from that being the case, the figures of the past year show the remarkable total of nearly $22,000,000, taking into account only building permits of $5,000 and upwards. It is true that these figures include buildings of the combination character, containing both flats and stores, but these form only a small proportion of the total.

It is evident from these figures that the people of Chicago are inclining more and more to residence in flats. The total of house construction, including only permits above $5,000, amounted for the year 1905 to less than $3,000,000, the greatest percentage of house building having been in the northwest section of the city.

It might be thought that, in view of the rapidity with which flat buildings have been constructed during the year, it would be difficult to fill them, but the contrary is the case, and all reports from owners, builders and agents agree that rents are well maintained, which is a sure evidence of the fact that the supply has by no means outstripped the demand.



Front View of Country Residence of Mr. Eugene J. de Sabla, San Mateo *Willis Polk, Architect* C-418



Rear View of Country Residence of Mr. Eugene J. de Sabla *Willis Polk, Architect* C-419

A Palatial Country Home

ARCHITECT WILLIS POLK has prepared plans for a palatial country residence for Mr. Eugene J. de Sabla, Jr., millionaire. The house will be unique in that it will be the first large country house on the Pacific Coast constructed entirely of brick and stone. It will be built at San Mateo.

The house will be the first example on this Coast of English renaissance of the Tudor period. Its mullion windows and Jacobean ornament and its arcaded loggia and vaulted vestibule will all be in harmony with the best examples to be found in any of the old English country places. The structure will be surrounded by a broad terrace, affording ample space for the much-sought-after outdoor country life of this section. The interior will contain a typical Old English hallway, with oak wainscoting and large chimney place. The main staircase will also be a feature of Elizabethian decoration.

The site of the mansion is that of the famous Howard homestead, El Cerrita. The latter was originally laid out by W. D. M. Howard and the first portion of it was brought around Cape Horn in the early '50's. Since that time it has been added to, and it is probably the most interesting of all California's country homes, many architects having been employed in its construction. After Mrs. Bowie's death, the house was occupied by some of the younger members of the Howard family, then by Charles A. Baldwin, the Tobins and others and finally passed into the possession of Walter S. Martin, who made extensive alterations and redecorated it throughout.

Mr. de Sabla recently bought the place, and will retain only the most modern part of the old buildings. The additions that he is now constructing are of the most permanent character.

* * *

To Build Fine Art Gallery

THE Southern California Chapter of American Institute of Architects has purchased the lot fronting 50 feet on the east side of Alvarado, between Sixth and Orange streets, directly opposite Westlake Park, having a depth of 177 feet.

The purpose is to ultimately put up an art gallery, that will be more particularly devoted to architecture and permanent exhibits of casts, so that students may have the best examples before them, and to provide lecture halls and assembly rooms where all interested in architecture may have an opportunity to meet and study, and where architectural and drawing classes can meet. The building will also be made the headquarters for the architectural profession in Southern California where opportunities can be given for the development of all that is best in art and architecture.

At present a small building will be erected on the rear of the lot, that will be used as an assembly hall and sketch studio which will be the nucleus of the completed institution.

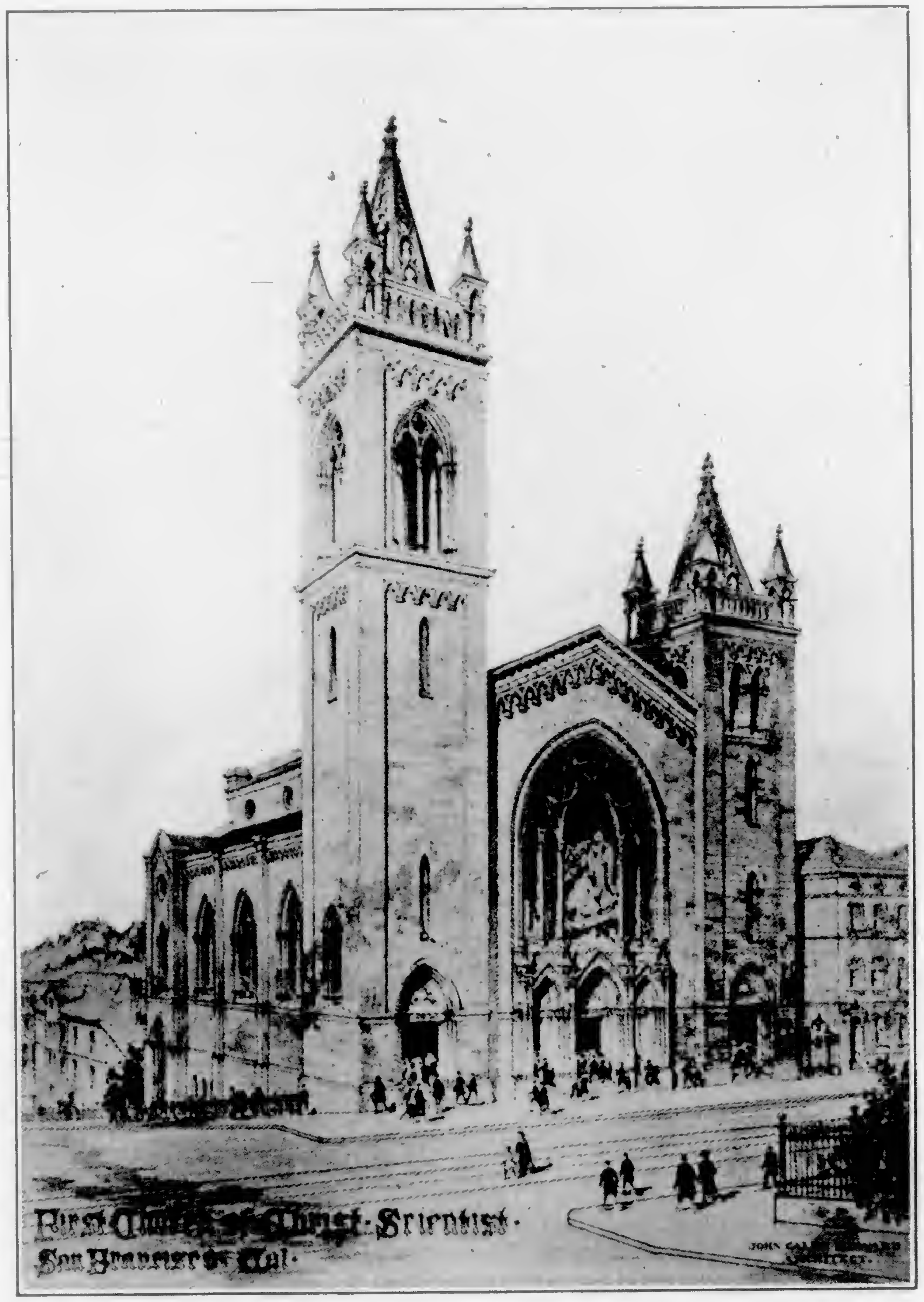
* * *

Auctioneer—"Going! Going! Gone! Here, sir, it's yours. Great bargain, sir. The frame alone is worth the price." Connoisseur (ripping out the picture)—"The frame was what I wanted."—New York Weekly.

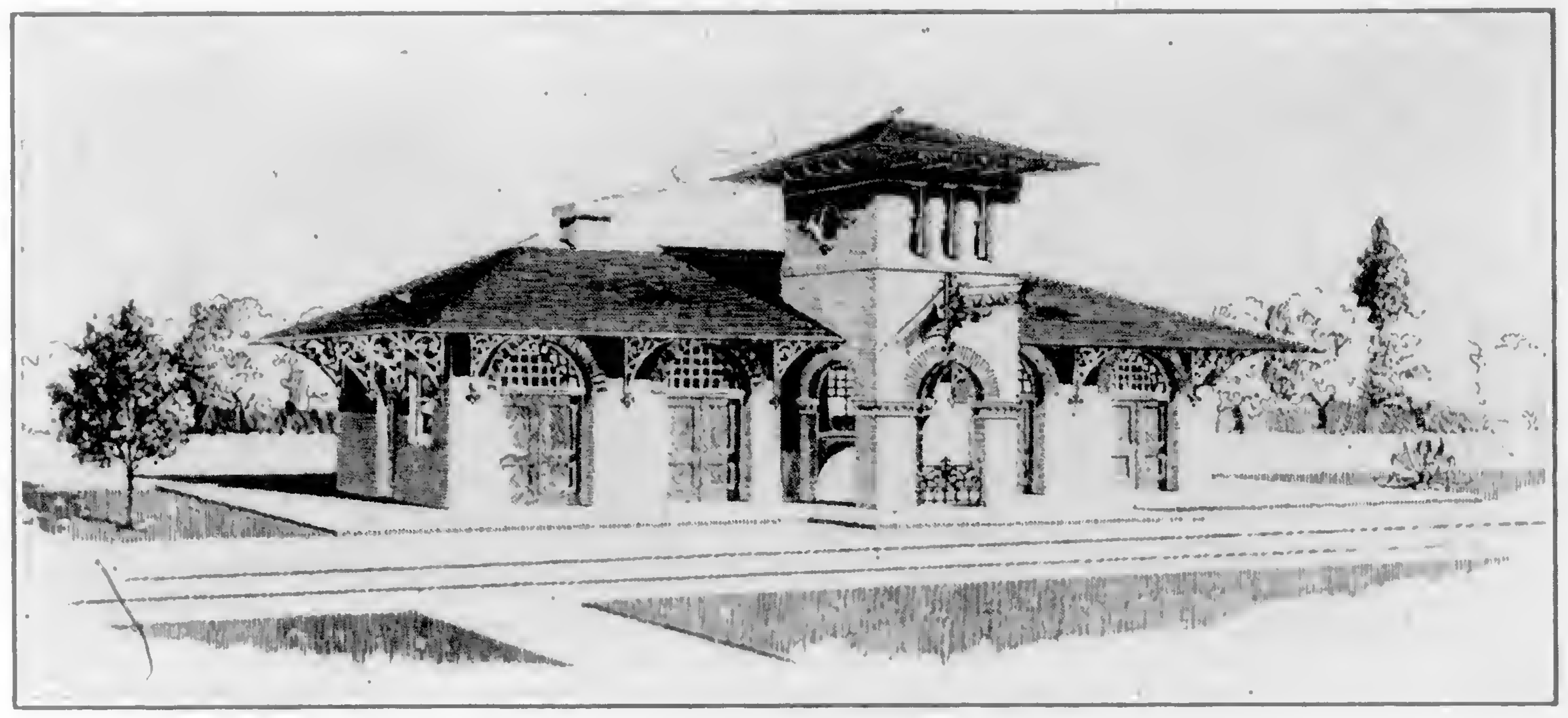
* * *

Customer (in restaurant)—"Waiter, I wish you would bring me a medium-done porterhouse steak smothered in mushrooms."

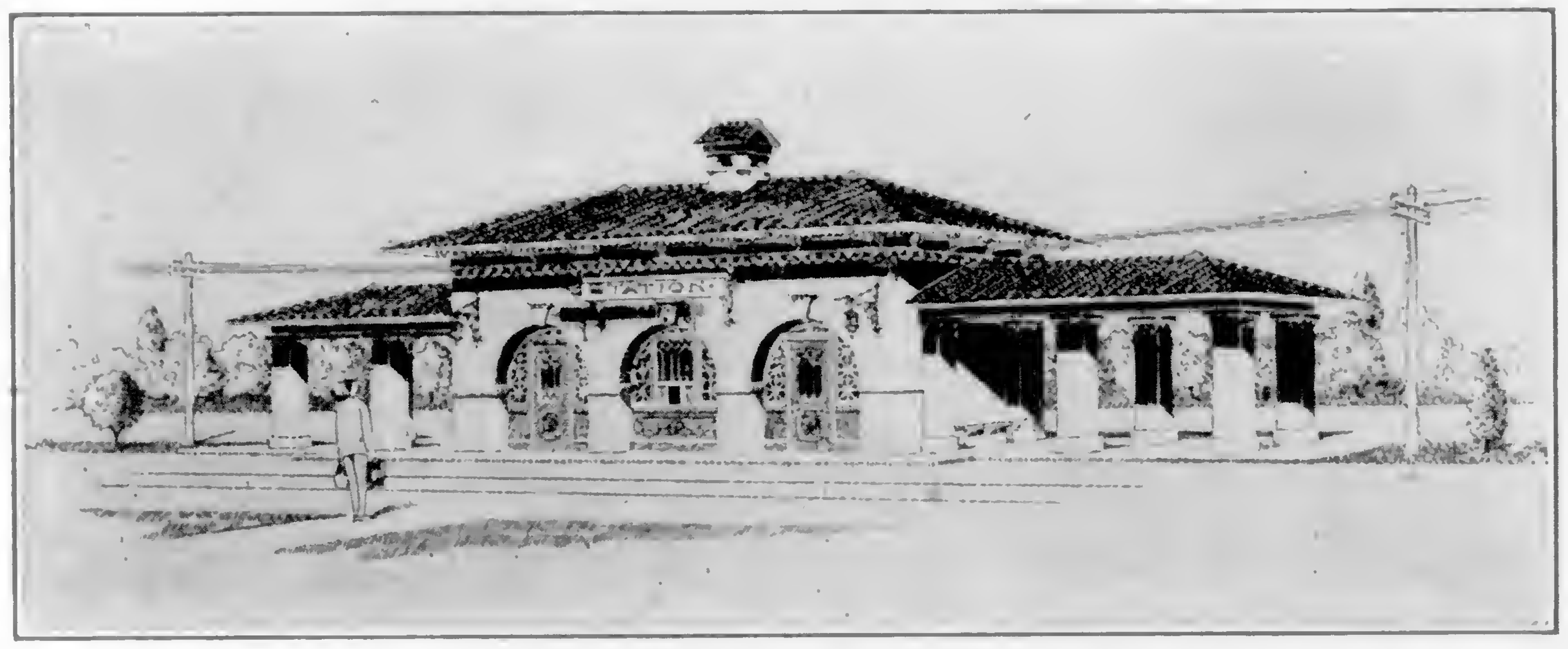
Waiter (to cook)—"Choke one with the toadstool!"—Milwaukee Sentinel.


First Church of Christ · Scientist ·
San Francisco Cal ·
John Galen Howard Architect

First Church of Christ, Scientist *John Galen Howard, Architect* C-420



Design for Suburban Depot *R. A. Herold, Architect* C-421



Another Design for Suburban Depot *R. A. Herold, Architect* C-422

Cement and Concrete

Reinforced Concrete Construction in the Marysville Public Library

By M. C. COUCHOT, C. E.*

THE Marysville Public Library is the gift of C. Q. Packard, Esq., to the city of Marysville, and is a beautiful stone building, 75 x 75 in plan, set on a large lot on the corner of Fourth and D streets, where it will always be surrounded by a large lawn, which will always insure plenty of light and its prominent individuality. The plans are from William Curlett, architect. The exterior walls are of Colusa sandstone. The roof is of red tile. All the interior construction, including floors, beams, girders, lintel and parts of roof slabs are of reinforced concrete, built on the Kahn system of reinforcement.

The columns in the basement are 16 inches in diameter and 10 feet high and in the first floor, supporting the mezzanine and second floor, are 22 inches in diameter and 22 feet high and reinforced with eight ½-inch vertical rods and a continuous ¼-inch wire helix, 2½-inch pitch, according to the method of Mr. Considere.

The main girders over the main room are 18 x 32 inches, 32-foot span, and are reinforced with three 1¼-inch and two 1-inch Kahn bars.

All the main slabs in the building proper are of the hollow tile construction, 8, 10 and 12 inches in depth, set 16 inches on centers, giving a 4-inch space in which a ¾-inch Kahn bar is set and concrete poured in, making really a number of concrete joists 16 inches on centers. The spans are about 12 feet to 20 feet for this construction and are very rigid, sound-proof and fireproof.

The work was erected during the hottest months of the year—July, August and September—and the greatest care had to be used in doing this concrete work, necessitating the material to be mixed dry below and taken up in the building to be wet right at the place where it was going to be put in, as it would not stand the transportation without taking initial set.

The results were very satisfactory. The hollow tile construction is particularly well adapted for this class of building, as well as for hospital, schools, theatres and office buildings, where large clear spans are desired, as spans as high as 30 feet can be had very easily.

The use of reinforced concrete is progressing rather slowly in California, where the climatic conditions are ideal for this form of construction and where all the materials are easily obtainable. But present indications show that the architects, owners and builders are taking cognition of the merits of this construction and that we may expect a decided increase in the number of buildings of this type, as in the Eastern States.

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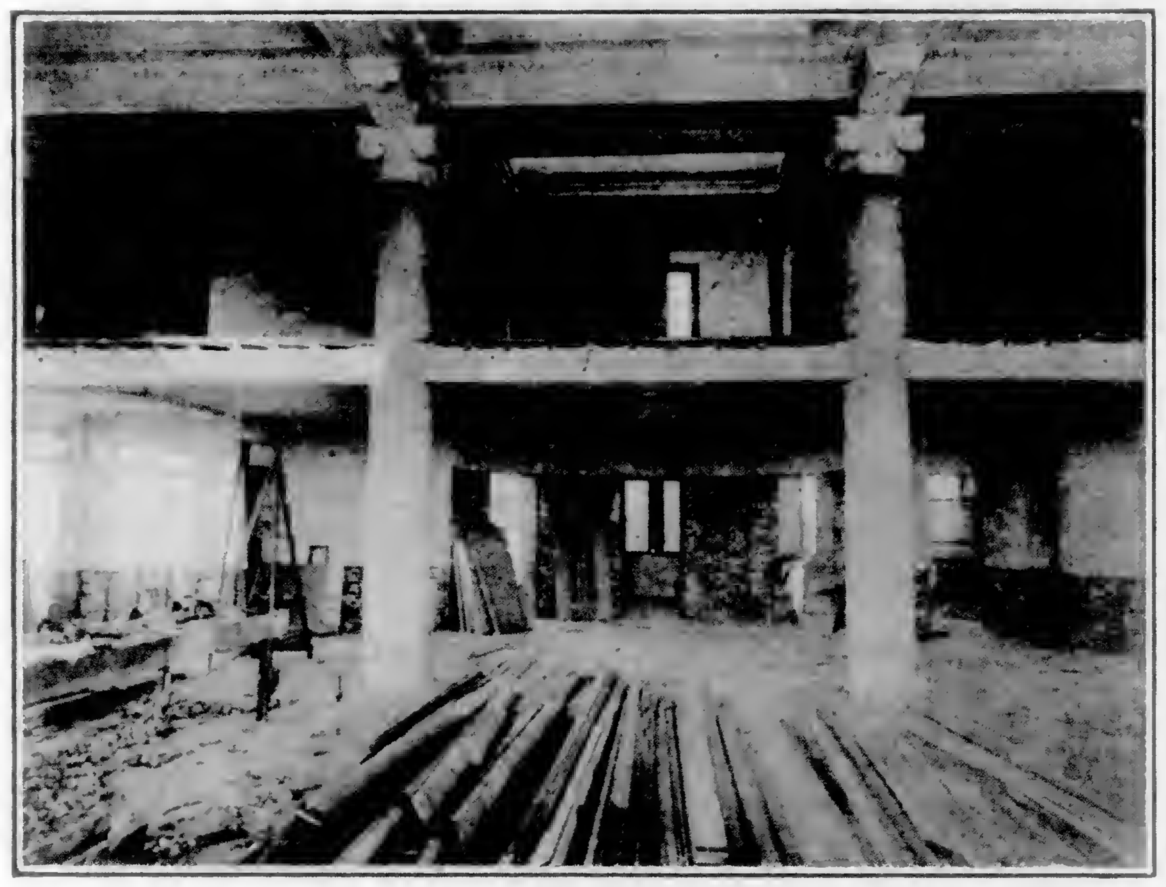
*Associate Member American Society of Civil Engineers, 604 Mission Street, San Francisco.

Marysville Public Library *William Curlett, Architect* C-423
Maurice C. Couchot, Engineer



View Showing Mezzanine Floor and 32-foot Span Girders, Marysville Public Library C-424

View Showing Tile Construction, Basement Marysville Public Library C-425

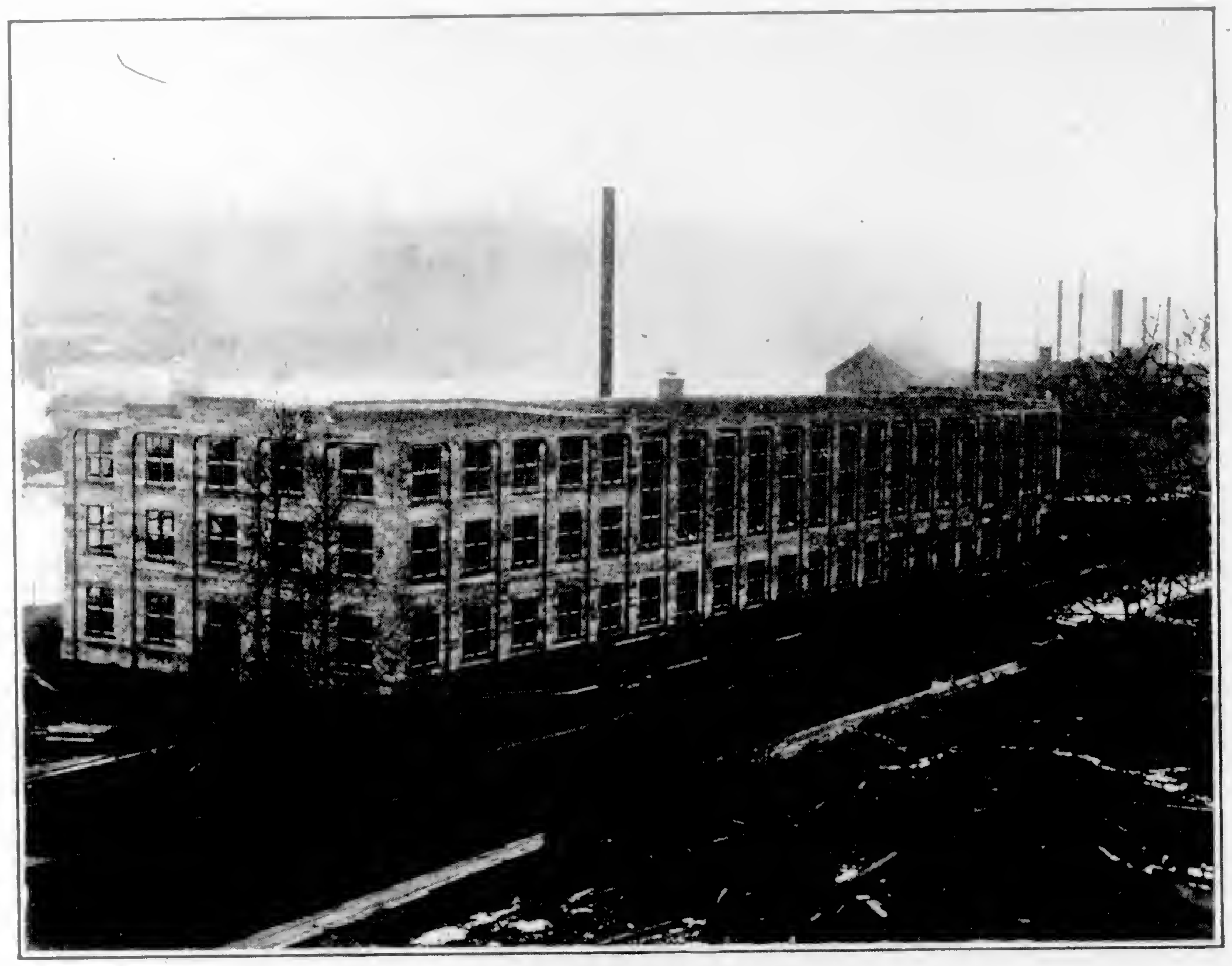
Curing Concrete Blocks

J. R. WHITE, of Elnloruk, Neb., writes in Municipal Engineering, about a method of curing cement blocks, which is a cheap and practical way for the operation of small works. He says: "We have made a practical use of it this summer and find it very satisfactory. We have racks built and covered with lumber four deep, two racks with a 4-foot alley between them with enough projections of roof to shade both sides. Each rack is wide enough for two tiers, so we use both sides. We set blocks out on these for twenty-four hours without any water (unless the heat or wind is rather severe, when we will sprinkle lightly a time or two as judgment dictates). Then we remove to the yards for further curing, where we can stack them three or four blocks high. When the day's work of yesterday is thus stacked, we give a thorough wetting, after which we cover them with some old hay, covering all ends and sides as thoroughly as possible. Then we keep the hay thoroughly wet from ten days to two weeks. The blocks cure nicely and practically evenly this way, and I believe that it will equal any system that is used to-day. I think that any manufacturer can use this method. If the old hay should be in the way, a good way would be to take burlap and make mattresses out of it. Excelsior is also good, the theory being to keep dampness on the outside of the block. We have cured something over 10,000 blocks this year in this way and are well pleased with the result."

* * *

"I know, old chappie," said Dobbs, "she has her faults, and a temper, and all that; but I—I love her and can't live without her."

"Just so," calmly replied his friend; "but the question isn't that. Can you live with her?"



Exterior View of Willamette Pulp and Paper Mill at Oregon City, Built of Reinforced Concrete C-426

Another View of Willamette Pulp and Paper Company's Mill at Oregon City, Oregon. C-427

Paper Mill on the Pacific Coast of Reinforced Concrete

EARLY in 1905 the Willamette Pulp and Paper Company, of Oregon City, Oregon, presented plans to the Pacific Construction Company for a very large paper mill building to be erected in the city named.

The plans called for a brick and steel building, but by advice of F. A. Koetitz, chief engineer and vice-president, and F. M. Butler, secretary of the Pacific Construction Company, the plans were changed so as to call for reinforced concrete in place of brick.

The advice upon which this change was based was given for several reasons. In the first place, the Willamette Pulp and Paper Company were in haste to have their building built, and it was shown that much time could be saved by using reinforced concrete in place of brick.

Another principal reason was the conditions that would naturally surround a building erected in this special location, and devoted to the special purpose of pulp and paper manufacturing. The climate of Oregon City is a very rainy one, and the making of pulp and paper at the same time necessitates the use of a great deal of water; consequently, a building so located and so employed would be subjected to much moisture, both from without and within.

The paper mill building is at Oregon City, and is the largest of the kind on the Pacific slope. It is 339 feet long, 92 feet wide, and its walls are 56 feet high. It has a basement and two floors at the "beater" room end, and a basement and single floor in the machine-room end, with 20 feet between floors.

The foundation was laid upon a bed of heavy bowlders from the river. Trenches for the foundation walls were dug in the bowlders, and footings five feet wide put in.

On the top of these walls, and reaching up to the sills of the basement windows, the walls of the superstructure were made 28 inches thick; while the main walls of the building were made 12 inches thick, buttressed by 3-foot pilasters, 16 feet on centers, the pilasters being 20 inches thick. These pilasters are reinforced by corrugated steel bars, six bars being imbedded in each pilaster, and held in place by bands of 5/16 round iron, one foot apart. Through the main walls, both above and beneath the window openings, and extending the entire length of the walls, corrugated steel bars were also used.

Supporting the floors are concrete columns 20x24 inches in size and 16 feet apart lengthwise of the building, and at varying distances crosswise of the building, the distances being regulated to accommodate the machinery, and there being four lines of columns.

The main girders running lengthwise of the building are 20x30 inches, and the cross beams connecting thereto are 14x26 inches. The columns are reinforced by corrugated steel bars, four in each column, connected and held in place by 5/16 round iron. The beams are reinforced by both Kahn and corrugated bars. The floors comprise concrete slabs of an average thickness of six inches, which are reinforced by expanded metal. The top is finished with the usual sidewalk finish. In the basement story are also placed numerous piers for carrying the weight of the line shafts and paper mill machinery, all being reinforced by the same material as used in the beams.

For setting the heavy paper machinery and handling the product a traveling 90-ft. crane was furnished. This crane moves on a track of I-beams.

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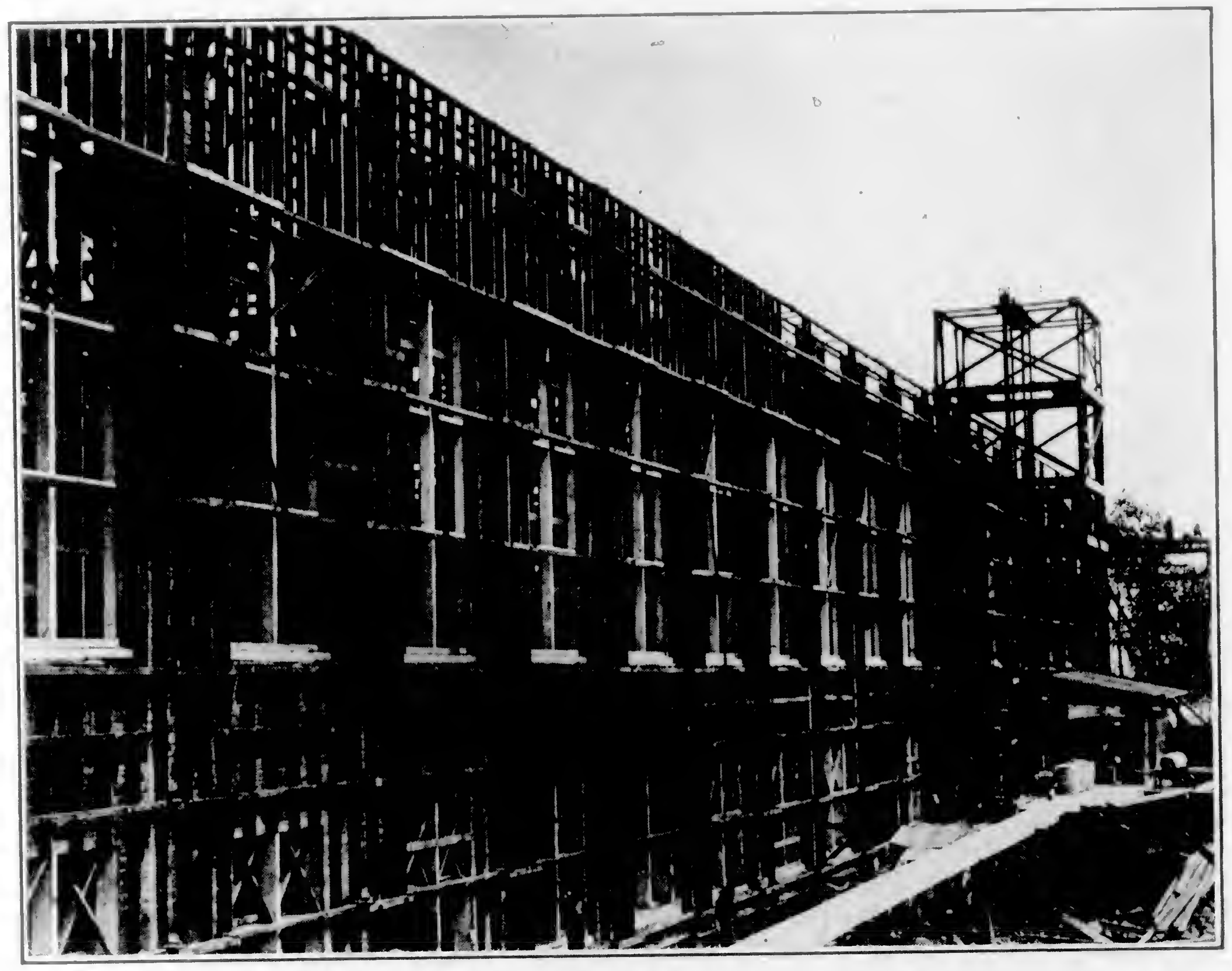
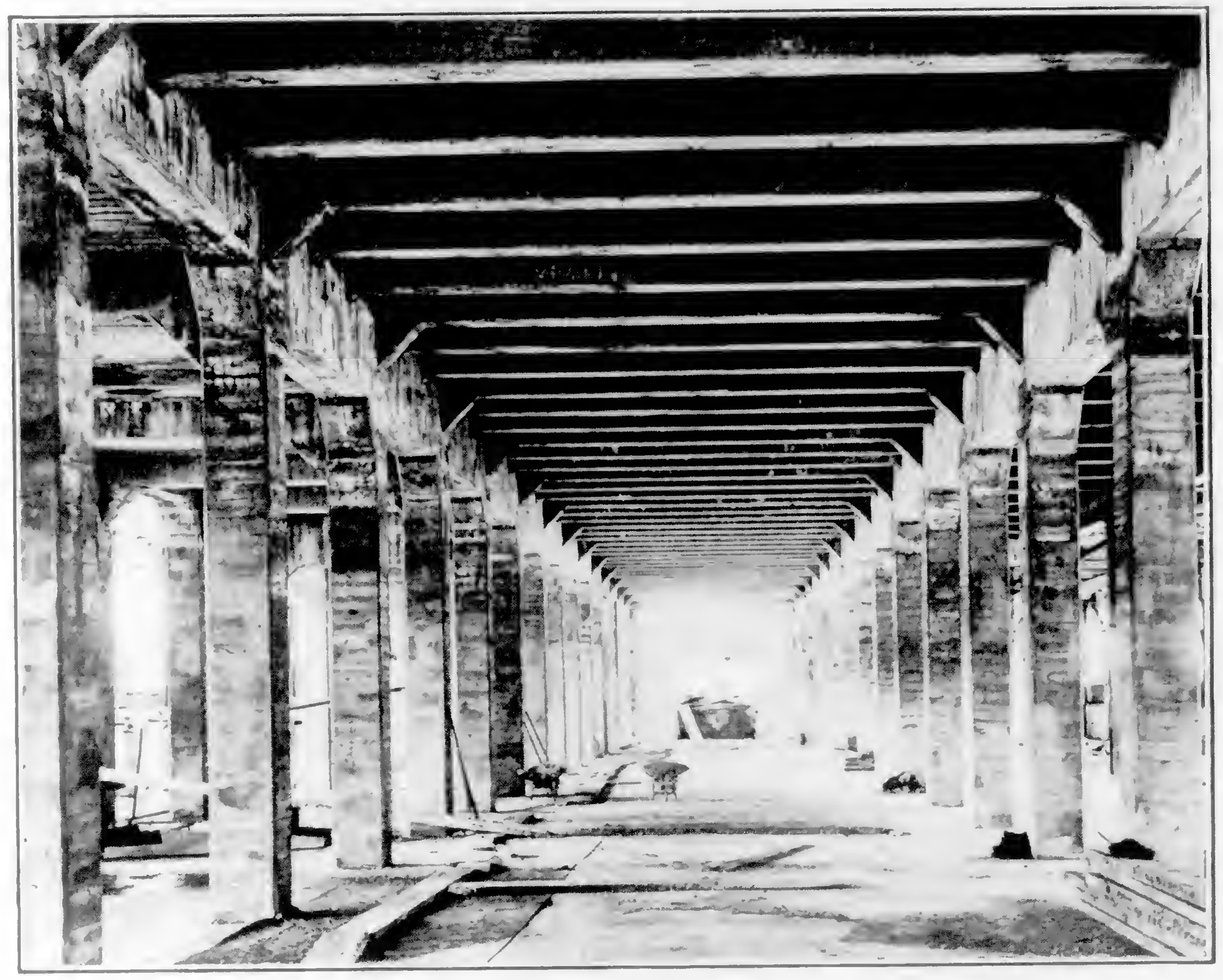


Showing Concrete Forms, Willamette Paper Mill C-428



Showing Reinforced Concrete Columns and Beams, Wiliamette Paper Mill C-429

which are carried on concrete projections or brackets, which are a part of each pilaster. These brackets were reinforced with corrugated bars.

The materials used in the manufacture of the concrete consisted of local Willamette River gravel and Columbia River sand mixed with Teutonia cement. Mixture, 1-2 and 4.

The form sheathing was beveled 1x6 surfaced boards.

The roof trusses are steel girders spanning the whole 92 feet width of the building, and the roof covering is of wood felt with graveled top.

The materials entering into the manufacture of the concrete were landed upon the bank of the river near the site of the building, loaded into cars with an electric derrick, and the cars were then run to the mixer hopper.

After passing through the mixer the material was delivered into wheelbarrows, and the loaded wheelbarrows were raised to the required height by electric elevators.

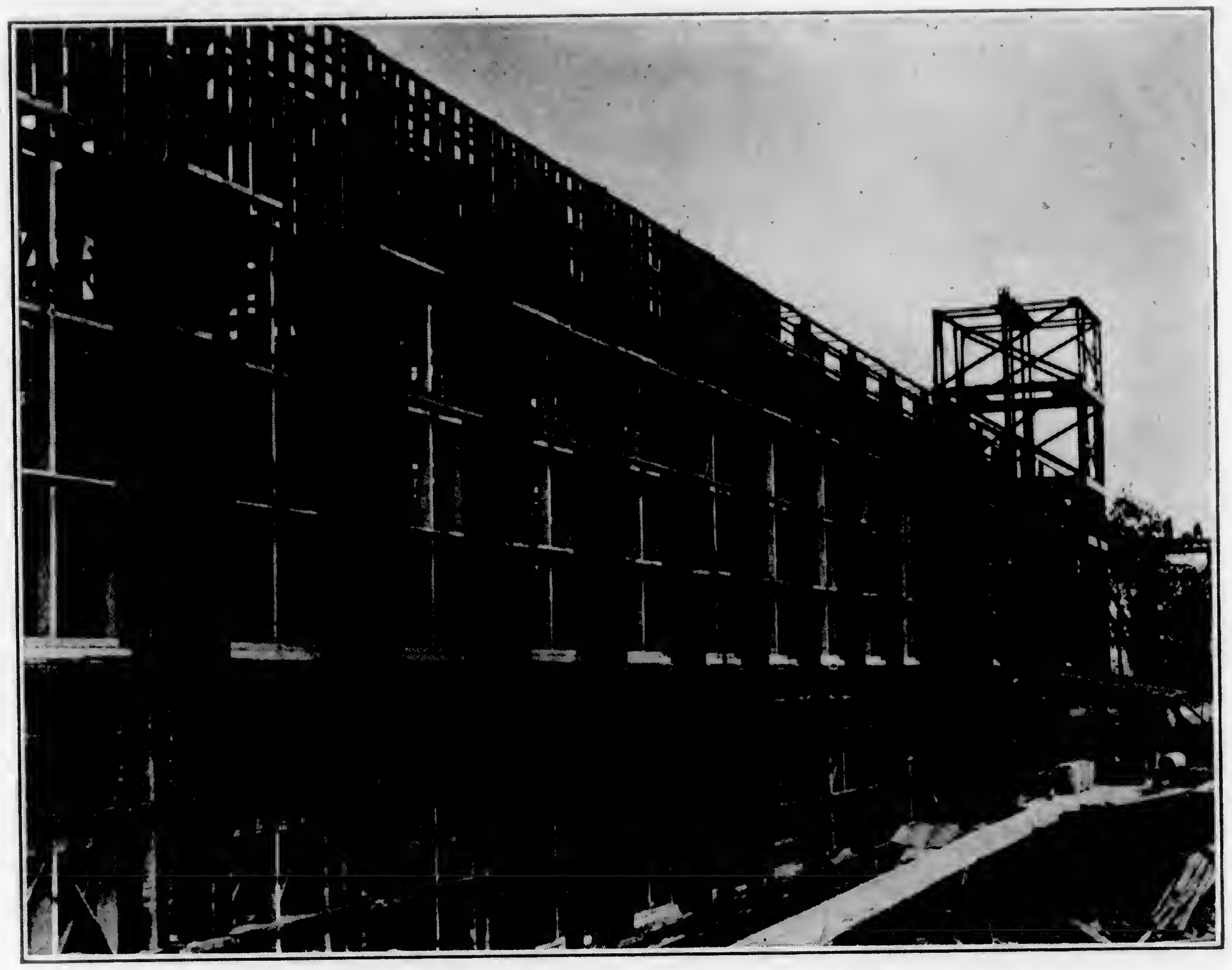
The floor system in this building was designed for a 400-lb. per foot load, and has been repeatedly tested during the placing of the machinery up to 800 lbs. without any possible sign of failure. It is a model in design for a mill building, and a credit to the owners and builders.

The same contractors are now erecting for the Bowers Rubber Works, near Black Diamond, California, a large mill building, which will be of nearly the same design as this Oregon building.

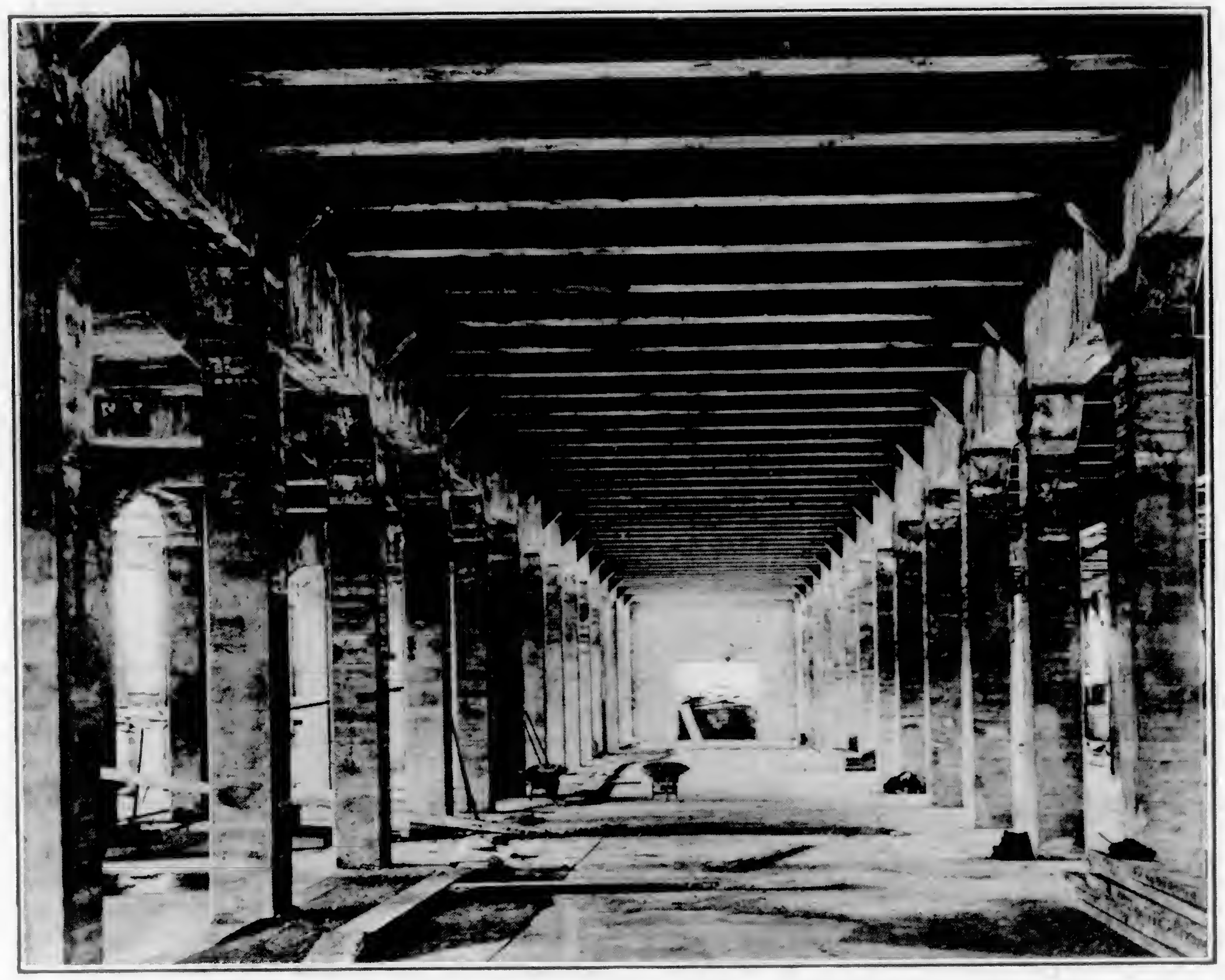
✣ ✣ ✣

Educating the Public

WHEN we talk about educating the public up to certain ideas of construction, the term "public" should be made to include the architects as well as the plain people. I mean no slight upon our brothers in the profession, but very many of them, and men of experience, too, don't seem to have the proper appreciation of the necessity of good construction. Then they blame people for insisting upon having an engineer look after the work. They think altogether too much ado is made over engineering, and often complain that people do not fully appreciate the architect's part of the work. It is clearly up to him, the architect, to pay more attention to construction if he does not want the engineer to carry off the best plums on the building tree. I have before me the specification of quite an important building and it, the specification, is a fair sample of what I have to revise day after day. This particular specification is for a hotel building involving an outlay of probably $350,000. The cutting of the stone, how it shall be dressed, just how the moldings shall be and all that sort of thing takes up 420 lines; the interior woodwork is covered by 286 lines; the painting and glazing 170; the decorative marble work 308; and the structure, the skeleton, its fireproofing, the very in'ards of the whole structure, is all described in just 16½ lines! Of course, there is a general clause that says all cements for concrete, steel work and so on, shall be subject to tests and inspection and the approval of the architect, but under this particular specification, if I were a contractor and inclined to be tricky, I know that I could figure on building that building, as far as the structure goes, just about as I pleased. The architects certainly have no one to blame but themselves if people feel that they have to call in engineers and experts to see that their buildings are properly designed as to their structure. Owners have gotten into the notion that they themselves can plan the essentials of a building, the little cupboards and things, that an engineer will fix them up a structure and that all the architect is good for is to put on a little prettiness outside and detail the beautiful hardwood, cabinet mantels, spindle stairways, etc., inside.—F. W. Fitzpatrick in Fireproof Magazine.



Showing Concrete Forms, Willamette Paper Mill C-428



Showing Reinforced Concrete Columns and Beams, Wiliamette Paper Mill C-429

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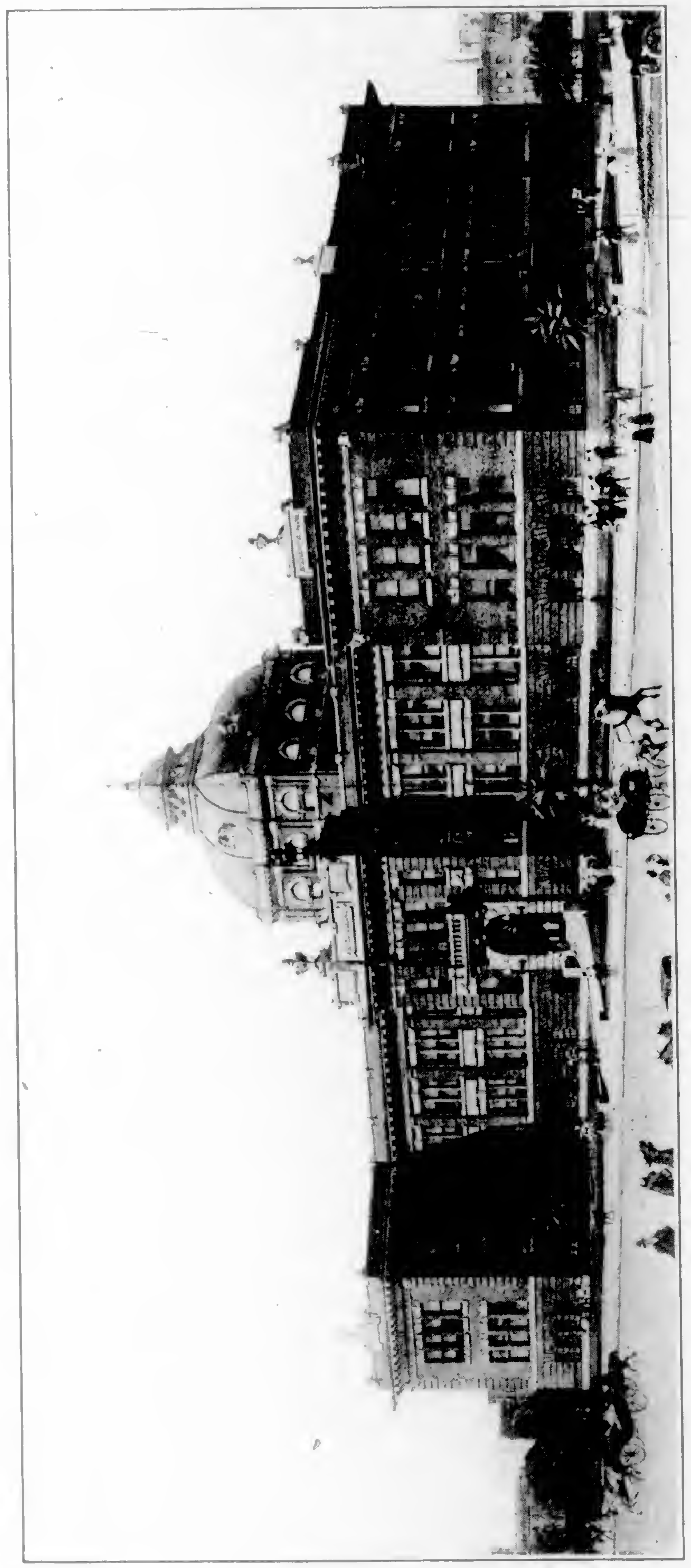
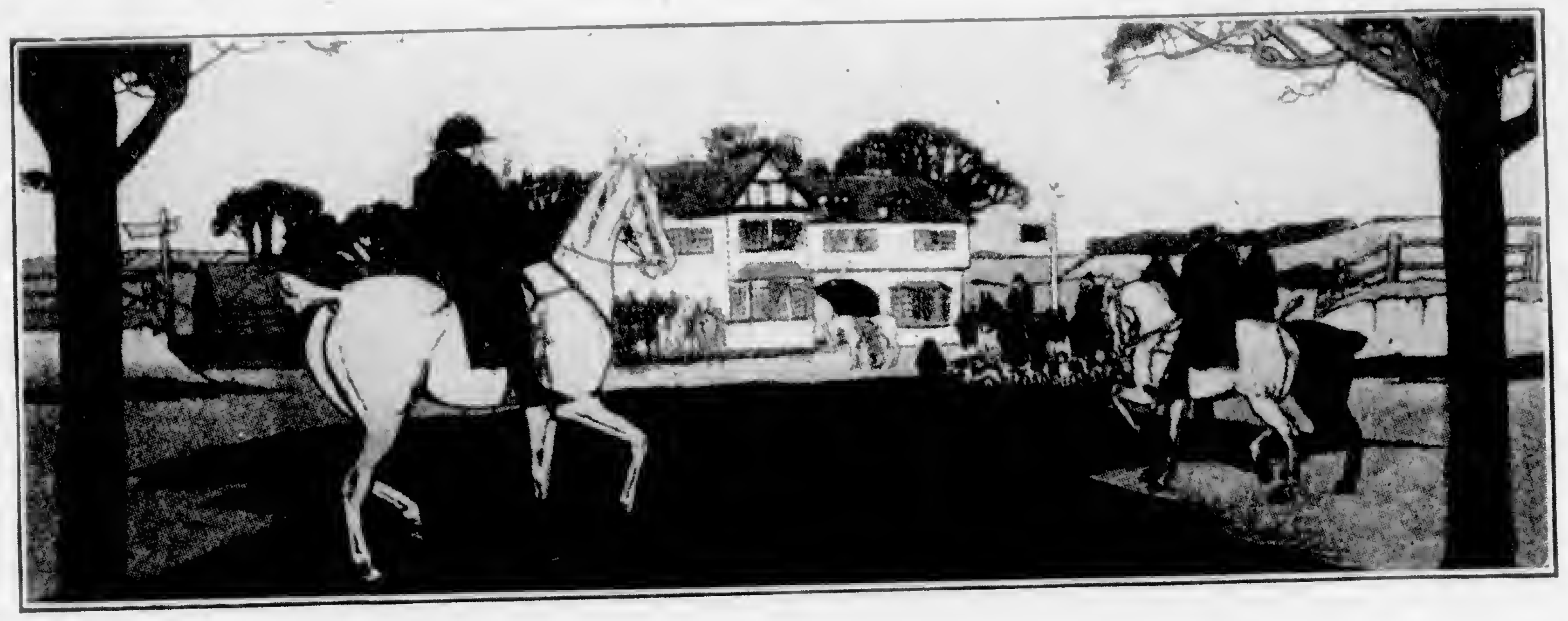


Accepted Design for High School at Sacramento

R. A. Herold, Architect C.430



Interior Decoration
Up-to-Date Furnishing

The Living-Room

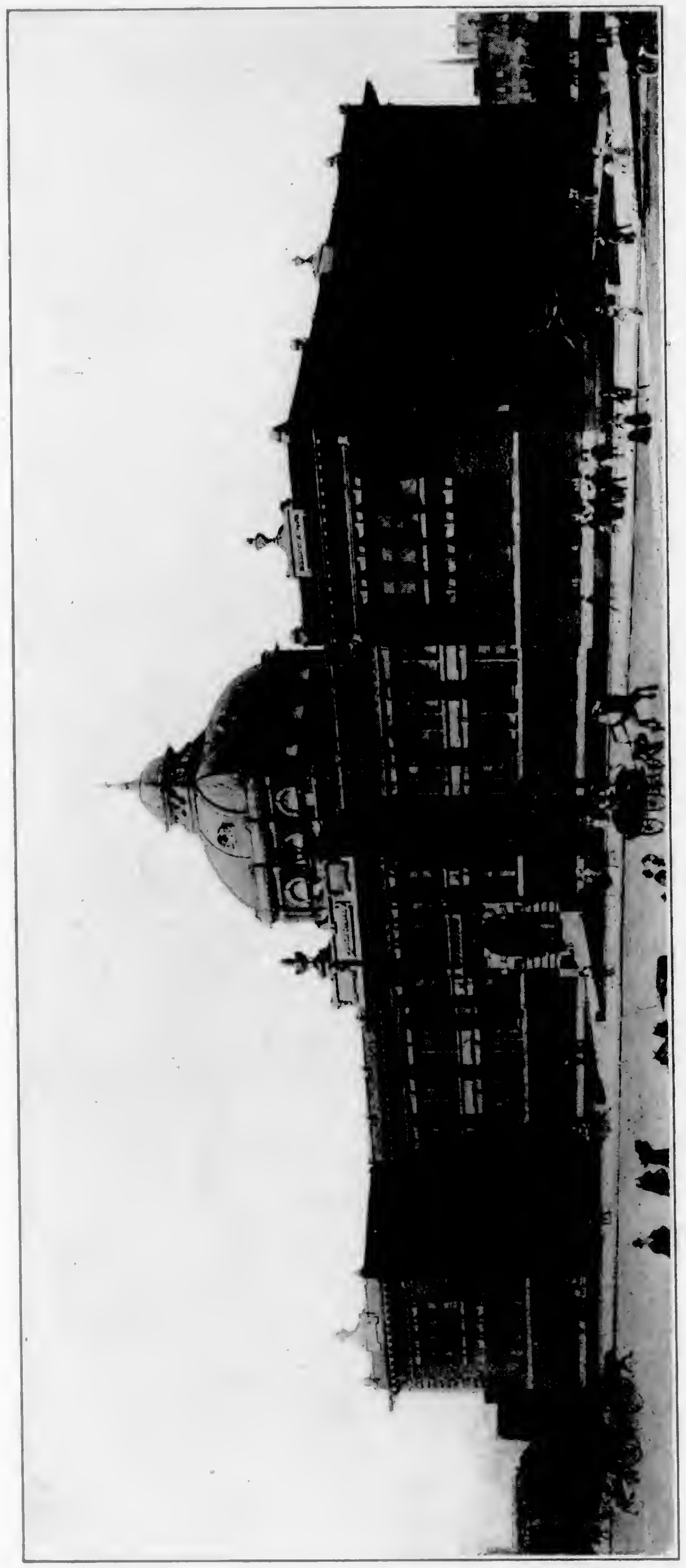
By C. WALTER TOZER

THE living-room has come to stay, and is now regarded as the most important room of the house. A large and simply furnished living-room, where the business of the home life may be carried on freely with pleasure, may well occupy all the space ordinarily divided off into small rooms, conventionally planned to meet supposed requirements.

The living-room is the executive chamber of the household where the family life centers and it is the place where work is to be done, and it is also the haven of rest for the workers. It is the place to which a man comes when his day's work is done, and where he wishes to find himself comfortable and at ease in surroundings that are in complete harmony with his daily life, thoughts and pursuits. The conventional parlor, which has been so common until recently, has been replaced by the living-room. Although we have gotten rid, to a great extent, of the odious word "parlor," and when it seems too pretentious to say "drawing-room" we say "living-room" instead, still the science of furnishing and decorating the apartment, so difficult to describe, appears to be even more difficult, judging from even our latest endeavor.

If an American be prosperous in money matters, he is so apt to furnish and decorate his living-room in very bad taste. His furniture will no doubt be of bad design while the decorations will neither be those for a living-room nor those for a reception-room, but just an incongruous mixture.

To decorate the living-room, which should always have some kind of doors to make it distinct and separate from the hall, avoid "piano-top" effects, except for the piano itself, for all highly varnished surfaces tend to defeat the purposes of every day usage; at least they make us feel uncomfortable, even if we have the means to revarnish again, for scratches are always unsightly and disorderly. Choose the dull waxed finishes for your living-room; as with the dining-room, do not effect a severely pronounced style. That is the underdone way of decorating.



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To decorate the living-room, which should always have some kind of doors to make it distinct and separate from the hall, avoid "piano-top" effects, except for the piano itself, for all highly varnished surfaces tend to defeat the purposes of every day usage; at least they make us feel uncomfortable, even if we have the means to revarnish again, for scratches are always unsightly and disorderly. Choose the dull waxed finishes for your living-room; as with the dining-room, do not effect a severely pronounced style. That is the underdone way of decorating.

And do not go in too much for the latest cult, such as we have in Mission furniture, so called. Mission furniture, while good in many respects, has been vulgarized by fashion. Do not try to have the furniture all match. Really good, historical pieces of furniture rarely clash with one another. On the other hand do not select a number of inharmonious things. Better err upon the other side, and have too few things, even to a sense of emptiness; for nothing is more fatal to a successful living-room than crowding and confusion.

The living-room must be, above all things, homelike. Reds and browns and soft tapestry greens appearing in the wall paper, the floor covering and the draperies will help toward this result, and the furniture should be of the comfortable, rather than the ornate variety. A fireplace, when possible, is a wonderful addition, and a reading lamp makes the room look far more inviting at night than gas or electric chandeliers. There are a great many styles of wall paper and wall hangings that can be used to very good advantage in the living-room. The soft fabric effects are excellent for the walls, with a preference for quiet patterns if there are many pictures. The landscape frieze, of which there are so many beautiful ones, is also very effective. Nothing too obtrusive in either pattern or coloring should be used in this room. The restful and homelike effect should prevail, and this cannot be obtained with highly colored and bold patterned wall hangings.

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Taste in Household Decoration

THE great requirement in household furnishings is taste. It is, of course, thoroughly delightful to have as much money to spend on a house as one wishes to, and to be indifferent, so far as the money goes, as to how much is spent; but it is much more important, as to results, to have only good things, disposed in a good way, charming wall papers, refined ornaments, exquisite combinations. These are the elements which go to make an artistic interior, not the mere amount of money paid for them.

The price of an article is no criterion of its merit, except that high priced articles should have greater art value than low priced goods. Art, real art, is costly, because much time and effort goes into its production. The genuine artist works slowly; if he belongs to the first rank he will produce but one or two masterpieces a year, perhaps not more than one in several years. He will use costly raw materials, because he knows his use of them will result in a fine production. He will apply to his task the knowledge and experience gained by many years of effort, possibly years of unremunerative effort. And in the meanwhile he has lived and must live, and he expects to be recouped for his expenses. All these things make his prices large, although his profits may be very small.

On general grounds, therefore, good art is expensive. So also is bad art. Very high prices are often charged for very bad objects, and, which is very much worse, obtained for them. The result is much more disastrous than being simply a bad purchase, for many people are fascinated by high prices, and will pay large sums for false works of art which not only have no right place in a house, but which destroy the effect of whatever symmetry and harmony and beauty may have been obtained by artistic effort.

Nothing so completely destroys the effect of any room so much as the introduction of a gaudy, conspicuous, unartistic object which has no right place in any well designed and artistically arranged home. It is bad enough when such things are given to one; it is scarcely short of a crime to deliberately purchase them under the singular notion that something of genuine art value is being obtained. It is bad in every sense. It shows that the possessor has no real taste herself, and it encourages the production of fake art objects, which would quickly disappear from the shops were there no market for them.

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession :: :: ::

Goes to Paris.

A. Dodge Coplin, in a letter to the Architect and Engineer of California, writes as follows:

Washington, D. C., March 19, 1906.—Now which one of you, in a late issue of your magazine, said that I had removed to New York permanently? To be sure, I did remove to New York, but likewise to Boston, Philadelphia, Baltimore and Washington, but only for a brief sojourn, brothers, therefore temper the statement in your columns and instead credit the writer with temporary absence while en route through the East and Europe. Am even now leaving for a brush with the March Atlantic storms, and hope in a few days to be in Paris.

A great deal of large and heavy work is progressing in all parts of our country, and here in Washington are a round dozen of undertakings quite collossal in size.

Senator Clark, who has recently spent large sums in a Fifth avenue, New York, residence, and which your journal recently illustrated, has invaded the Capital with the same desire, and is already having beautiful dwellings in a whole block razed to give way to another architectural dream for his Washington abode. (And we trust it will be more consistent than the Fifth avenue one.)

The classic beauty of several of the old government buildings, still chaste in line and proportions, is quite gratifying to look upon. The White House, also still retaining its colonial quiet splendor, remains planted on an undulating stretch of nature's common, reflecting the modesty of our form of government. Yet, on the other hand, a visit to the wings of the Capitol, and a bent ear to a few days' debate by the oratorical stars of our commonwealth, soon assures the visitor that things here are not quite as quiet as they seem. The roll and tumble of political strife and destiny surges by—but largely "underground," for things here flow deep and the game flies high.

Noting the rapid advance of steel in general construction reminds one of the close affinity the architect and engineer of the future must have for each other. In fact, I see some architects use both names to designate their professional card. So it seems that the name "Architect and Engineer" is above criticism as a title to an architectural publication. And may all continued success come to this publication and profession in general throughout the Pacific Coast.

A. DODGE COPLIN.

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Concrete Reservoir.

The Quartermaster's Dept., U. S. A., has accepted the plans and bids for a reinforced concrete reservoir for Fort Miley. The design, which was submitted by Cotton Bros. with their bid was made by Jno. B. Leonard, C. E. There were several bids for a less amount than the one accepted.

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The members of San Francisco Chapter, American Institute of Architects, enjoyed a banquet at the St. Francis Hotel the night of March 31st. Reinforced concrete was discussed informally, among those participating in the debate being William Curlitt, Clinton Day and President Henry A. Schulze.

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The firm of Wright & Polk, architects, at 124 Sansome street, San Francisco, has dissolved partnership, Mr Polk retaining the old offices while Mr. Wright has moved to 604 Montgomery street.

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Building Reports

Malt House, Sacramento. Architect, R. A. Herald, Sacramento. Cost, $175,000. Owner, Buffalo Brewing Company. The plans call for a four-story brick building, 105x80 feet, with iron and steel frame.

Elks' Building, San Diego. Owner, Elks' Building Association, San Diego. Cost, $50,000. Plans have been drawn for a brick and stone building, fire-proof, three stories and classic style. There will be stores on the ground floor, apartments on the second floor and lodge rooms on the top floor. The building will occupy the northwest corner of Second and D streets.

Residence, N street, between 17th and 18th, Sacramento. Architects, Seadler & Hoen, Sacramento. Cost, $8,000. Owner, James Elliott, Sacramento. Figures are now being taken for this house, which will be two stories, cement foundation and built of mahogany and oak.

Red Men's Hall, Sacramento. Owner, Sacramento Tribe of Red Men. Cost, $50,000. The plans have been finished by a San Francisco architect and may be seen at the Red Men's Wigwam, Sacramento. The plans call for a four-story brick building, with concrete block foundations, electric elevator, etc. Will be built on Tenth street, between I and J. Part of the contracts have already been let.

Fruit Cannery, Oakland, Cal. Land has been sold in Fruitvale on which it is stated there is to be erected a concrete and brick building for a fruit cannery.

Library, Gilroy, Cal. Andrew Carnegie has agreed to donate $10,000 for a public library building in Gilroy.

Bank Building, Sebastopol, Cal. The directors of the Bank of Sebastopol are considering plans for the erection of their new building, to be on the corner of Main street and Santa Rosa avenue.

Apartment House, Fillmore and Geary streets, San Francisco. Architects, Reid Bros., Claus Spreckels Building, San Francisco. Cost, $40,000. Owner, Mrs. Emma Butler. The plans, which are now being drawn, call for a unique colonial design, three stories, and stone foundation.

Three-story Building, Gough and Page streets, San Francisco. Architect, T. Patterson Ross. Cost, $35,000. Owner, S. F. Pumbers' Association. Building will be of brick and terra cotta.

High School, Sacramento. Architect, R. A. Herold. Cost, $150,000. The plans of Mr. Herold have been accepted. The building is to be of brick, three stories, with large dome; stone trimmings.

Flats, Van Ness avenue, San Francisco. Architects, Koenig & Pettigrew, Parrott Building, San Francisco. Cost, $45,000. Owner, Deaner & Stetson. The building will be four stories, with basement and frame construction.

Hotel, San Francisco. Architect, W. H. Armitage. Cost, $85,000. Mary Jane Daniell of London will erect a five-story building, to be built of iron, steel, brick and terra cotta, on pile foundations, at the junction of Clay, East and Merchant streets, opposite the Ferry Building.

Hotel, Seattle, Wash. President Moritz Thomsen of the Centennial Milling Company and A. M. Springer, a heavy Seattle property owner, are to erect a fourteen-story steel hotel building at the northeast corner of Sixth avenue south and Jackson street. The hotel will be 120x120 feet and will cost $500,000.

Residence, Santa Cruz. Architect, William Knowles, Post street, San Francisco. Owner, name withheld for present. Cost, $12,000. The house will overlook the ocean and will be one of the most picturesque residences in this famous watering place. The exterior will be of wood and plaster. The drawings are now being made.

Summer Residence, Menlo Park. Architect, William Knowles, Post street, San Francisco. Cost, $6,500. Owner, Dr. Carl Wilson, San Francisco. The house will be a shingled bungalow.

Masonic Temple, First street, San Jose. Architects, H. F. Starbuck, 206 Sansome street, San Francisco, and W. G. Page, San Jose. Cost, $50,000. Owners, Masonic Temple Building Association, San Jose. Plans by the two architects have been approved by the building committee and bids will be taken soon. Three stories; stone front; stores on ground floor; two halls; stained glass windows; elevators, etc.

The contract for building the new High School at Bakersfield, Stone & Smith, architects, has been let to the Lindgren-Hicks Co. for $50,000. The building is to be of brick.

City Hall, Reno, Nev. Plans have just been approved by the Reno, Nev., City Council for the erection of a new City Hall of brick and stone, to cost $75,000. The feature will be a 90-foot tower.

Alterations, Potomac Building, Los Angeles. Architects, Morgan & Walls, Los Angeles. Llewellyn Iron Works have taken the contract for removing the division wall between the Wetherby & North store, remove front walls and main entrance to building and put in new columns and girders and lintels, to carry front. Cost, $13,580. The wiring, plumbing, etc., for the building will be let later, under separate contracts.

Church, Fruitvale. The committee of the Episcopal Mission has selected a lot at the southeast corner of Nicol avenue and Capp street and work on the church edifice will soon begin.

Apartment Houses, Oakand. C. H. McGregor, contractor, is arranging to build two large apartment houses on northeast corner of Third avenue and East Sixteenth streets, one block from the car barns of the Oakland Traction Company. This will be for the convenience of the employes of the company.

Electric Lighting Station, Jessie street, San Francisco. Architect, Willis Polk, Sansome street, San Francisco. Cost $100,000. Owner, San Francisco Gas & Electric Light Company. The new building will replace the one recently destroyed by fire. It will be of brick outside, while the interior will be of glazed white terra cotta.

Hotel addition, Market street, San Francisco. Owner, Palace Hotel Company. Cost, $200,000. It has been decided to add two stories to the Palace Hotel and plans are now being prepared. For additional information see Colonel Kirkpatrick, manager of the hotel.

Hotel, Berkeley. Architect, C. M. Cook, Oakland. Owner, J. A. Marshall, Berkeley. Cost, $65,000. Plans are being prepared for a five-story hotel building to be of brick and terra cotta.

Apartment House, Ocean avenue and Elm street, Long Beach. Architects, Train & Williams, Long Beach. Cost, $25,000. Owners, J. H. Mulnholland & Son. Plans call for a three-story building, plastered frame. To be Mission style.

Board of Trade Building, Salinas, Cal. The Salinas Board of Trade has instructed its President to communicate with Architect Weeks of Watsonville, in regard to plans for their new building.

College Building, Spokane, Wash. Four new buildings, instead of one, are planned for the Spokane College, which is to be built in Manito Park by the Norwegian Lutherans of America, assisted by the citizens of the Inland Empire. It is expected that the main building will be completed this year and opened for students. It will cost in the neighborhood of $35,000.

Fire-proof building, Los Angeles, Cal. John C. Austin and Frederick C. Brown are preparing working drawings for the ten-story fire-proof building to be erected by Wright & Callender at Fourth and Hill streets. It will cost $200,000.

Fire-proof building, Los Angeles. Work will begin May 2d on the ten-story Central Block at Fifth and Springs streets. Carl Leonardt has the principal contract at $299,000. The building will cost $800,000. It will be occupied by the Security Savings Bank and offices.

Library, Monrovia, Cal. The Board has accepted plans and specifications for the new Carnegie Library, prepared by W. J. Bleisner.

Telephone Building, San Bernardino, Cal. The Sunset Telephone & Telegraph Company will at once build a modern exchange building of brick and stone, place wires underground and make other improvements in the service at a cost of more than $30,000.

Stores and flats, Fifty-third and Market streets, Oakland. Architect, C. M. Cook. Owner, E. L. Coryell. Cost, $7,500. The building will be two stories having two tile roof towers. Wood and plaster exterior, Mission style. There will be two stores and the same number of flats.

Telephone Building, Franklin street, Oakland. Architect, Walter Mathews, Oakland. Owner, Home Telephone Company. Cost, $25,000. The plans for this building are now being completed. Basement and part of first floor will be of sandstone, the remainder of the building, which is to be three stories high, will be of brick and terra cotta.

Club House, Cedar street, Berkeley. Architects, Maybeck & White, San Francisco. Owner, Hillside Club Association. Cost, $5,700. Nelson & Boldt have just been awarded the general contract for the erection of this building.

Club House, Harrison near Fourteenth street, Oakland. Architect, A. W. Smith, Oakland. Owner, Ebell Club. Cost $25,000. The preliminary plans have just been approved and the architect has been instructed to proceed with the detail drawings. The building will be Old English in style. Three stories; frame construction and besides the various club rooms will contain a hall and theatre.

Office Building, Union Square avenue and Stockton streets, San Francisco. Architects, Cunningham & Politeo, San Francisco. Owner, Schroth Company. Cost, $300,000. This building which has been previously reported in these notices will be eighteen stories high. The exterior is to be of stone, frame of steel and all partitions and floors will be of fire-proof material. The building will have two basements and will contain 255 offices. There will be three rapid running elevators.

Residence Ross Valley. Architect, C. A. Meussdorffer, Parrott Building, San Francisco. Owner, Willard O. Waymaire, Ross Valley. Cost, $8,000. House will be two stories and basement.

City Hall, Fresno. C. J. Lindgren has been given the contract for building the new City Hall at Fresno. His bid was $60,436.

Residence, Vallejo, near Devisadero street, San Francisco. Architect, C. A. Meussdorffer, San Francisco. Owner, C. L. Clark. Cost, $10,000. House will be two stories with basement and attic and slate roof.

The same architect has plans for six flats for S. Savannah on Hayes street, near Baker, San Francisco, and a residence for Dr. Perry to be built in Ross Valley.

M. E. Church, corner Fifth and Pacific, Long Beach, California. Architects, Marsh & Russell, Los Angeles. Cost, $100,000. Building will be built of artificial stone.

Theatre, Portland, Oregon. State Senator C. F. Clay has sold a corner of Third and Madison streets to the Considine-Sullivan Vaudeville syndicate for $235,000. The theatrical men intend to build as soon as the street is regraded and widened. Plans for the theatre show a seating capacity of 1600 with 12 boxes and two balconies.

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HOUSES OF CONCRETE

The advent of concrete in house-building is a matter of concern to all classes. There has not been much of it in California, or on the Pacific Coast for that matter, up to the present time but there is every reason to believe that this particular mode of construction will become quite general in this section before long.

Reinforced concrete for large fire-proof buildings and bridges is bound to be accompanied by concrete house building. The doubt and prejudice that once existed with regard to concrete construction has almost entirely subsided and competent engineers and architects have demonstrated that it is no longer a problem to build a concrete house. Up to the present time there have been so few strictly concrete houses built on the coast that it would be difficult to make a comparison, from the standpoint of cost, with wood, brick and stone.

The fact that the prices of concrete construction work are decreasing with its more extended use in the building of homes is likely to impress the prospective builder who is looking for the newest, the best, and the cheapest with which to accomplish the desired result. In the East a large number of concrete houses have been erected at a cost actually less than that of frame buildings. As a result concrete is rapidly coming into favor as material for residence contracts.

Among the advantages claimed by advocates of the concrete houses are that being fire-proof, the insurance rates are necessarily much less; the house retains warmth, rejects heat, reducing the expense for fuel while the cost of repairs is little or nothing since concrete is practically indestructible.

The objection to building a home of concrete most commonly offered by architects is that it does not permit of artistic effort. A concrete home, they say, looks too cold and bare. It is believed, however, that in time it will be possible to make the concrete house quite as picturesque and artistic as the mansion of brick, stone or wood.

A WORD TO HOME-BUILDERS

There are women, no doubt, who would be guilty of sending their daughters to a public gathering, dressed respectively in green, yellow and red. Of the same ilk, says "Good Housekeeping," is the person, man or woman, who will paint his house yellow next door to a green one, or build a seashore cottage of native stone and shingles on a narrow city lot between Queen Anne and mission houses, or crowd an architectural monstrosity, bristling with angles and pinnacles and jig-saw ornamentation, between two dignified mansions of a simple and severe type.

Architects have hinted and urged and exhorted, and still home-builders in many instances—we might say, a majority—ignore the manifest requirements of space and surrounding architecture, to the detriment of their own homes. If we have not attained unto simplicity and grace in domestic architecture, we may yet take thought to the extent of recognizing our surroundings.

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THE SKYSCRAPER IN CALIFORNIA

When, a few years ago, Architect John C. Pelton sketched a birdseye view of San Francisco, showing numerous stately buildings rising well toward the clouds, the conservative San Francisco resident was wont to belittle Mr. Pelton's fanciful dream of the near future. It will be a great many years before the metropolis of the West will have the number of high buildings pictured by that architect, the more skeptical ones argued. But it is less than five years since Mr. Pelton made this picture and there are in reality more towering buildings in San Francisco to-day than the number shown in the sketch.

New York and Chicago can no longer boast of being without a rival in fireproof construction. Population considered, San Francisco can make quite as creditable a showing in high buildings as the two Eastern cities. The showing made by the California city is all the more remarkable in that nearly two-thirds of this class of construction has been carried on in the last four or five years. The year 1906 will probably see the commencement or completion of no less than a dozen great structures, among which we might mention the Humbolt Savings Bank building, sixteen stories; the Schroth building, eighteen stories and shown on the cover of this magazine; the Head building, fourteen stories; the Chronicle building, sixteen stories and others, not quite so high, like the Butler building, the Monadnock building and the St. Francis Hotel. The question has been asked us if the "high building craze is not being overdone." We answer, No. San Francisco is growing. Her future prosperity cannot be overestimated. There will be no trouble filling all the big buildings now under construction or that are being planned and as many more besides.

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HOLLOW BLOCKS, GOOD AND BAD

Out of a very large number of patented and unpatented devices for making hollow concrete building blocks, and there are a couple of hundred of varied designs now being advertised and sold, there are a few planned and constructed on sound mechanical principles, which, properly handled, will turn out most excellent concrete building material.

During the past year a number of these have been set up in California, and some very good, a much larger quantity of indifferent, and much too large a proportion of miserably poor blocks have been manufactured.

The object of this short article is to state and emphasize the fact that in almost no instance can the failure of the blocks be laid to the machine in which they were made.

The failures can be ascribed in a very few instances to the use of unsound cementing material, but in the majority of cases must be ascribed to the very evident lack of knowledge or of carelessness of the makers of the blocks.

To successfully appeal to those whose favor must be secured in order to assure business success, the blocks must be sound and capable of carrying wall pressures with the usual margins of safety required; they must be reasonably impervious to water, and the finish must be good. The appearance must be pleasing to the eye, and the arras lines must be true, and sharp, and hard.

These points are absolutely essential, but the ability to secure them appears not to be possessed as yet by all who have gone into the "hollow block" business in California. The result is too large an output of blocks which must bring harm rather than benefit to the new industry, and there is no reason for this unfortunate condition.

If the Portland cement used were properly tested before use, as it should be by every block manufacturer, the few cases of failure resulting from unsound cement would be eliminated.

A cursory investigation which we have recently made, however, shows that in less than one case in ten are the simplest tests resorted to. That there is not more failure from this cause is only evidence of the honesty of the cement manufacturers.

The maker of a fine quality of concrete, such as should invariably go into the making of a building block, who does not know enough of the fundamental principles of concrete manufacture as to so proportion the inert aggregates used as to minimize air spaces or voids, should not, and indeed he can not long remain in the business. This improper selection of the various particles of sand, gravel or stone, is responsible for much of the porosity for which too many of the building blocks are rightfully condemned. The other reason is, of course, the unadulterated, downright stinginess in the matter of incorporating the Portland cement.

Where large sized stone aggregates may be used, as in massive abutments and foundations, and indeed in most other work, it is possible beyond question to manufacture a sufficiently strong concrete containing but one part in eight or ten of Portland cement. But in the manufacture of hollow building blocks, whose walls and webs are but three inches in thickness, more or less, much finer stone must be used, and a much larger surface of inert material must be coated with the cementing material. Concrete for hollow building block work should consist of at least 20% of good, sound, finely ground Portland cement.

Then as to the mechanical part of the work. Mechanical mixers do infinitely better work than can be done by shovel and hoe, but sufficiently good work can be done by the shovel and hoe method, and in many, very many cases, it is not done, and the carelessness is inexcusable. The result is a block spotty in strength, texture and appearance, a block that will help to hinder the inevitable growth of the industry.

Finally, in our opinion, it will be found advisable to turn out with a machine and a gang of men 150 well-tamped, carefully handled, approximately perfect blocks per day; good honest blocks that will almost sell themselves, than to feverishly rush out 200 blocks that are not homogeneous in texture, because of poor tamping, and with broken or patched corners that come from injudicious hurry in the handling.

Make a good block and it will bring what it is worth. Its inherent qualities, which are really marvelous, will bring this to pass, and it will help make a market for others of its kind.

A poor block had better be destroyed, for the enemies of the hollow block, and it has them, will hold it up as an example of all blocks. This is unfair, perhaps, but in this strenuous age many consider trade but a species of war, where everything is fair.

WILLIAM B. GESTER, C. E.

The Publisher's Corner

BOTH ARE HUSTLERS.

C. I. Chubbuck and R. E. Harris have formed a partnership under the firm name of Chubbuck & Harris, for the purpose of handling building materials, and have opened offices in the Atlas Building, 604 Mission street. They are selling agents for the following firms: Winsor's California Pottery and Terra Cotta Works, the California Brick and Pottery Company, Lamm Bros., Antwerp, Belgium (imported cements), the Baden Brick Company, and the Bostwick Expanded Metal Company of St. Louis.

Mr. Chubbuck has for the last five years been connected with the Steiger Terra Cotta and Pottery Works, and for two years as assistant manager and outside salesman.

Mr. Harris was salesman for the Western Fuel Company until he accepted the selling agency for the California Brick and Pottery Company, which he has held up to the present time. Both these young men are well and favorably known among the architects and contractors of San Francisco, and with their individual energy, backed up by the excellent lines they represent, they should undoubtedly do a very large business.

* *

WHAT X-OLITH IS

To the reader of the Architect and Engineer: "Let us tell you in a series of letters about X-Olith, what it is, how it is made, of what it is made, and its uses.

"X-Olith is a scientific combination of ground wood and stone—a cement wood-fiber; made into a plastic cement, laid for a floor, or wall, for wainscot, or base, and is particularly valuable where sanitary precautions are necessary, as in hospitals.

"As X-Olith became better known its uses expanded until now it is found in: Offices, schools, dairies, stores, lavatories, billiard-rooms, kitchens, breweries, natatoriums, laboratories, refrigerators, pantries, etc.

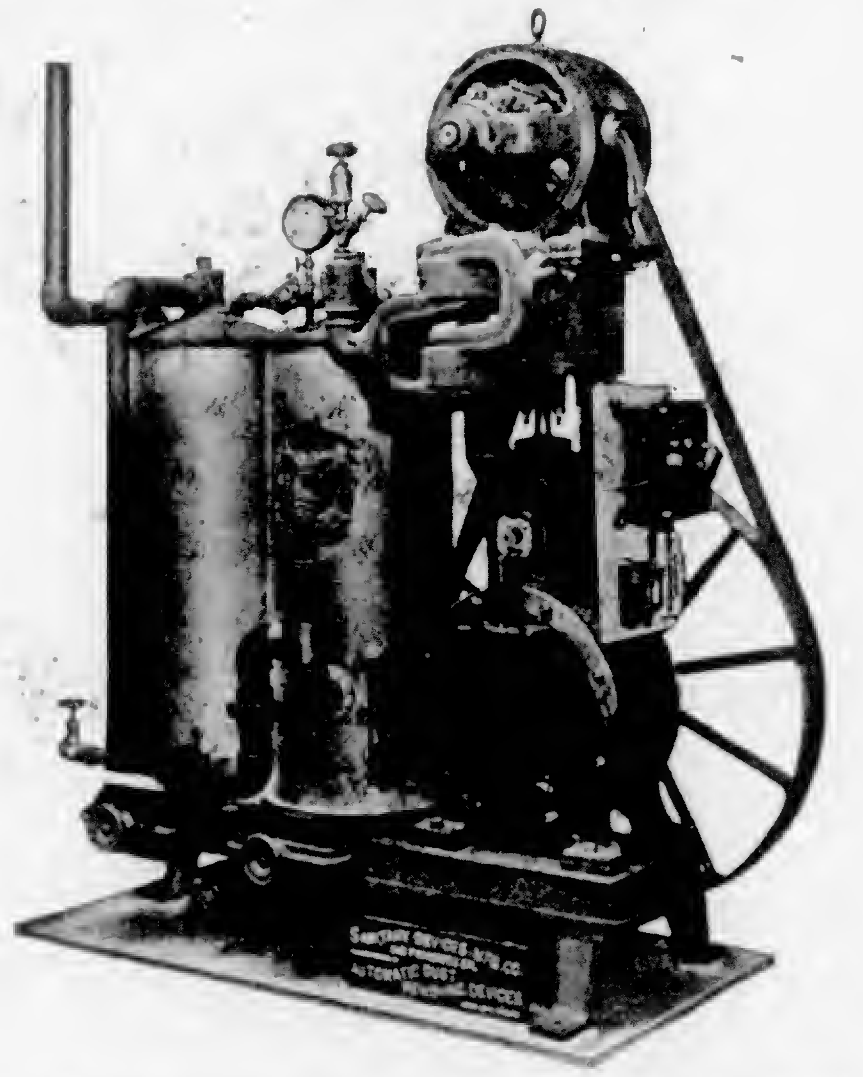
"The stone makes it outlast any other material used for like purposes and the wood-fiber makes it elastic, footwarm and tenacious, noiseless and cleanly.

"X-Olith is fireproof, damp-proof and sanitary. It is laid solid, there are no cracks or crevices for germs. There is a variety of colors and the center may be of one color and the border of another.

"Architects and builders are including X-Olith in specifications in new buildings and using it in old ones to make them as good as new. Samples will be cheerfully sent you upon request." The San Francisco office is at 153 New Montgomery street.

VACUUM SWEEPING PLANTS.

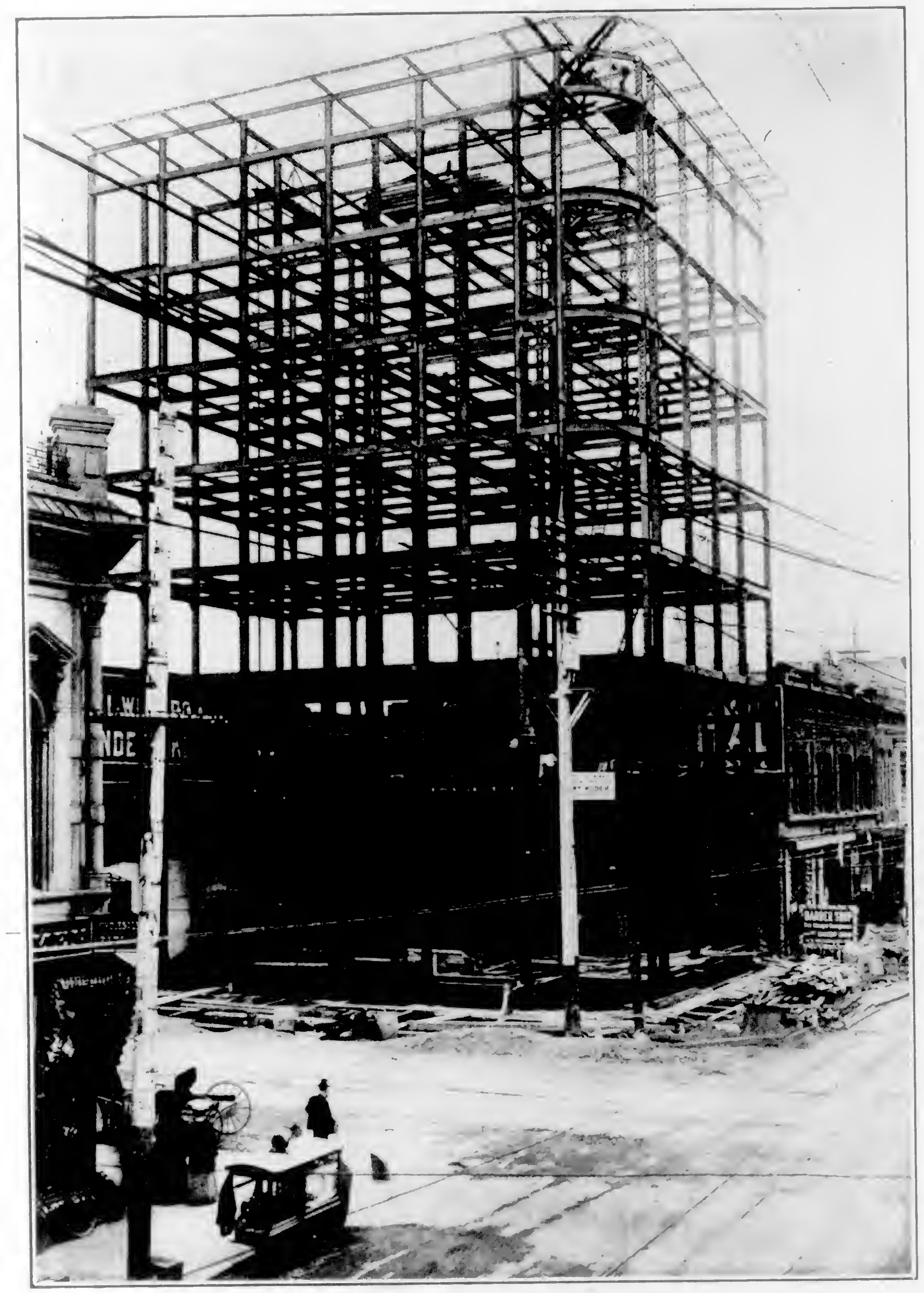
As time goes by the wants and needs of civilization are continually being fed by the inventive genius, and in this century no invention has been brought before the public that is daily becoming more and more in demand than vacuum sweeping plants.



While these plants were at first designed for hotels, theatres and public buildings, the manufacturers soon realized that private residences had as much need for them as the larger buildings.

The Sanitary Devices Manufacturing Company of San Francisco, the manufacturers of these plants, after careful experimenting, have now put on the market an especially designed plant for residences, perfect in every detail.

By referring to the cut, one can get an idea as to its appearance and size. The dimensions are: Length 5 feet, 2 inches; width, 3 feet, 4 inches; and height, 6 feet, 2 inches, so that there are but few basements that have not space enough for this machine.



Garden City Bank Building, San Jose. *Steel Frame by Clinton Bridge and Iron Works.* C-431

The wet and dry dust separating tanks thoroughly cleanse the air. The dry tank by means of centrifugal motion and gravity separates the heavier particles of dust, while the wet tank completes the process by passing the air current through the atomizer and a column of water, leaving the remaining matter in liquid suspension. The final removal of dust is simple and sanitary —from the dry tank by dumping trapvalve, and from the wet tank by drainage direct to the sewer.

It is so simple in operation that a child can intelligently operate it, as all that is necessary is to turn on the electric current to start the motor.

It is inexpensive, costing only about 8 cents per hour, and in one hour's time 200 yards of carpet can be thoroughly cleaned.

No labor is expended in taking care of it as an especially designed oiling system keeps the entire plant thoroughly lubricated for at least six months without attention.

Medical science has conceded that the majority of diseases are directly caused by germs. It is a well known fact that dust is the lurking place of the insidious germ. The question is how to dispose of dust. It is true that brooms serve to remove it to a certain extent, but the atmosphere becomes saturated with the finer particles, and this settles back into the carpets, walls, hangings, etc. The vacuum sweeper removes it thoroughly and renders dusting unnecessary.

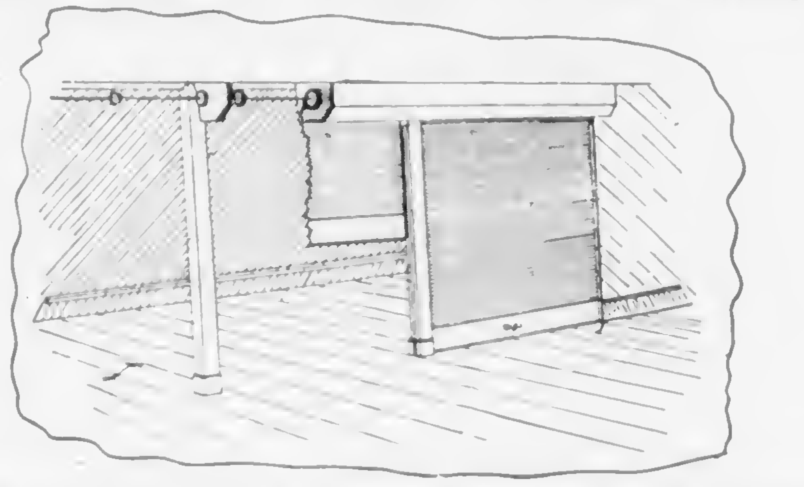
Aside from the fact that it is sanitary the process of vacuum cleaning tends to save carpets from wear. It is not the travel on a carpet that causes it to wear out, but the grinding of sand and particles of dust, which act the same as sandpaper would on a rough surface.

The time is fast approaching when all will recognize the fact that vacuum sweeping is one of the potent factors of self preservation.

✣ ✣

The Union Blind and Ladder Company, (Inc.), 328 Howard street, offer to architects and builders a perfect rolling partition. Here is what the company has to say about its goods:

"Our Rolling Wood Partitions do away with the objectionable sliding or folding doors, which are always out of order, occupying space for pockets at the sides, thus reducing the number of desirable seats from which an unobstructed view of the platform can be had, in school-rooms, churches and halls. The partition is made of slats two inches wide, through which flat steel bands pass, fastened at the top and bottom with an adjustment to take up any shrinkage. They are held in place at the sides by grooves, and roll up and down the same as a window shade. Their application is very simple, consisting of a shaft upon which are drums containing heavy steel springs. The shafts are supported at each end by lugs, the partition is fastened to the spring drums, and with the exception of being held in place by grooves at the sides, is put up and operated the same as a common window shade or curtain. The lugs taking the place of the shade fixtures, the shaft and drum of the roller and the partition of the cloth shade. Where they are used between class-rooms in school buildings we apply a blackboard surface of liquid slating to one side of the partition, and if necessary, furnish a hanging blackboard for the other side.



"We can cover any width opening by means of separate partitions and movable posts, which, when the partitions are rolled up, are quickly and easily removed, leaving the whole width entirely unobstructed.

"Their adaptability to churches and Sunday-school rooms can readily be seen, the floor space can be divided into any number and any size of class rooms, or when rolled up one large unbroken space obtained. Our partitions are made of white cedar, oil finish, ready for putting up. Our goods are all made in San Francisco and supplied at shortest notice."

R. E. Harris Telephone Montgomery 2221 C. I. Chubbuck

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Bee and Lamb Brands Imported Cements
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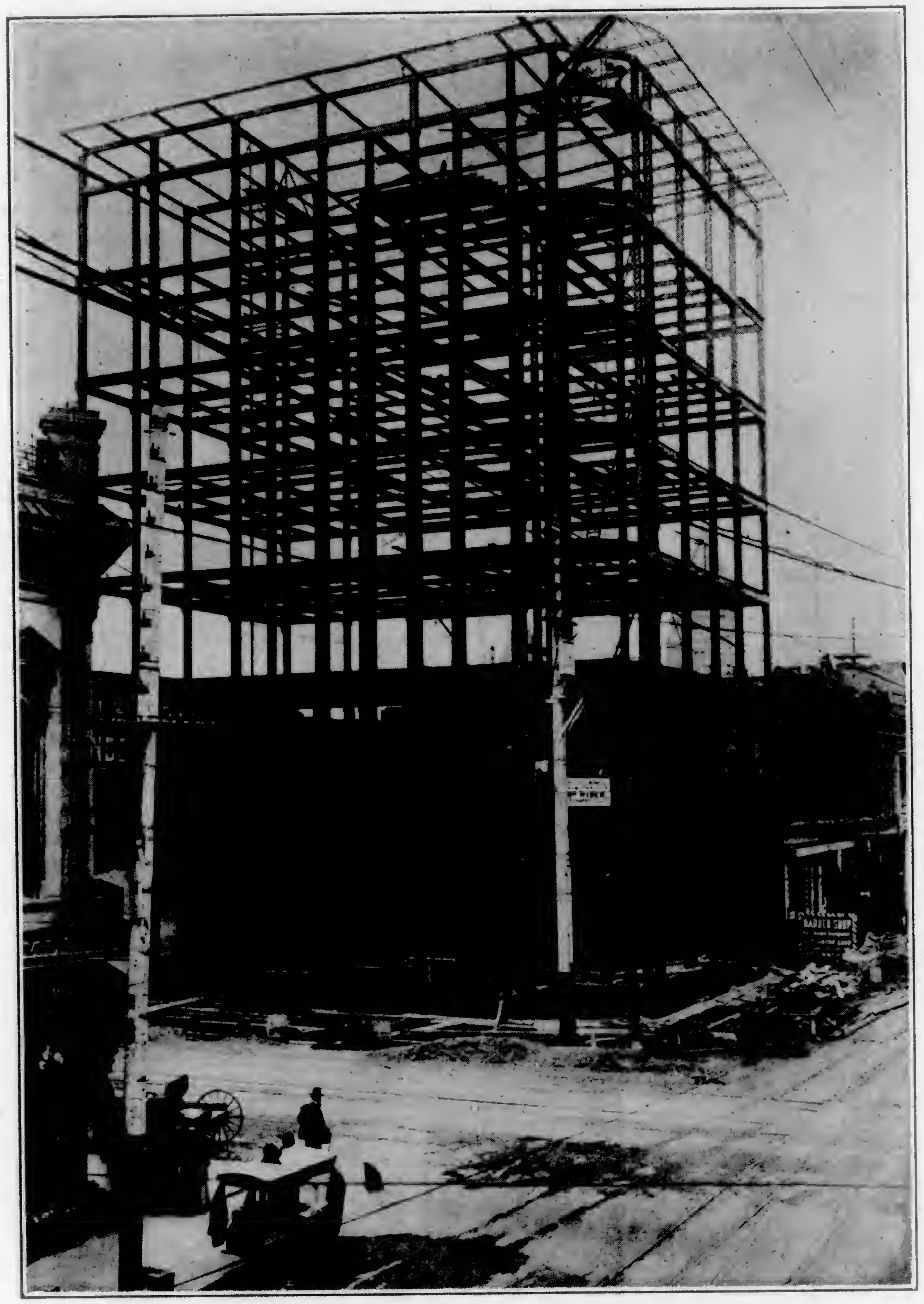
Office, Atlas Building, Room 402

604 MISSION STREET SAN FRANCISCO, CAL.



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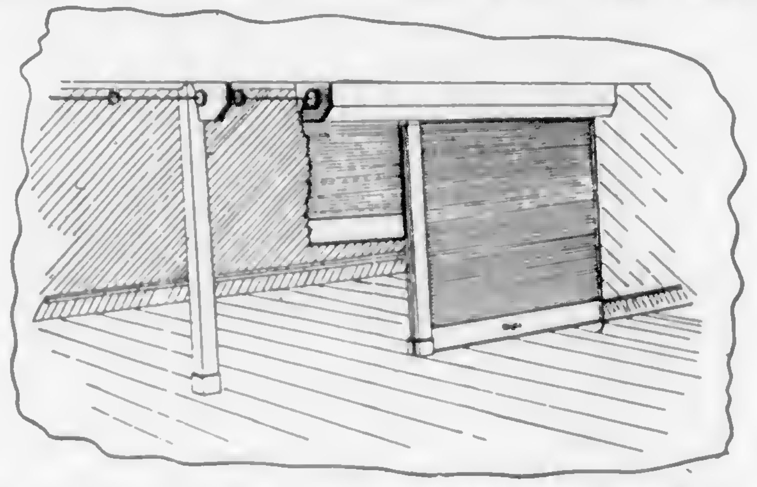

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604 MISSION STREET SAN FRANCISCO, CAL.

One of the most successful brass manufacturing plants on the Pacific Coast is that of the Standard Brass Casting Company on Clementina street, between First and Second, San Francisco. Although a comparatively young enterprise, being less than four years old, the company has had remarkable success and has outgrown its limited quarters, until to-day the most troublesome problem confronting its managers is the question of more room. The secret of the Standard Company's success has been its aim to produce only a high grade quality of goods. The principal product of the factory consists of brass water goods. Practically all of the output is made from the best quality of steam metal. The works were established by J. C. Higgins and N. Alper, in 1902, beginning with a small foundry and doing jobbing work exclusively. Since then a complete finishing shop with up-to-date equipment has been installed, comparing favorably with any of the big Eastern brass goods concerns. Outside of the water goods department the company also manufactures a full line of street railway equipment, such as trolley wheels, harps, etc. The Standard people are also in a position to figure on any job of brass goods in competition with material being sent out here in large quantities from the East. The company also manufactures architectural brass and bronze work, very good samples of which may be seen on many of San Francisco's big buildings.

New Building of Globe Electrical Works, Monterey.

✣ ✣ ✣

Will Erect Plant.

An interesting item of news in the sand-lime brick industry is that of a contract recently signed between the Schwarz System Brick Company of New York and Mr. W. F. Barnes of San Francisco, for the erection of a sand-lime brick plant in the latter city. Mr. Barnes is a man well known throughout the West, having for many years been engaged in the box, lumber, basket and barrel business. These various industries naturally employ a large quantity of machinery and this has placed Mr. Barnes in a position to judge intelligently of the various merits of the different kinds of machinery offered to the sand-lime brick industry. Mr. Barnes made a tour of this country, extending from the Pacific to the Atlantic Coast, and has visited several of the plants erected by each company offering sand-lime brick machinery. The selection of the machinery of the Schwarz System Brick Company by a man of the experience and standing of Mr. Barnes is quite an additional victory for the machinery, which received the Grand Prize at the St. Louis Exposition. Mr. Barnes has been appointed the agent for the "Scientific System" for the States of Washington, Oregon, California, Idaho, Nevada, Utah, Arizona and New Mexico, and the plant which he will erect in San Francisco will undoubtedly be an important help to him in demonstrating to the purchasers in the above territory, the peculiar advantages and excellence of the Schwarz System Brick Company.

Regarding the Schwarz System the Pottery Journal of Berlin has the following:

"To scientific chemist Schwarz we must ascribe the merit of having recognized the process taking place in hardening by steam and of having now also pointed out ways and means for satisfactory manufacture of excellent calcareous sandstones. This modern process of manufacture of calcareous sandstones as worked by Schwarz is based on the following principles: The moisture and the temperature must be so regulated that undesirable chemical combinations are prevented; the hardening process must have begun evenly before pressure and be carried to such a point that the work can be performed successfully with a minimum addition of lime. A great advantage in the working of this system is the circumstance that only ONE machine is required for mixing the material and preparing it for pressure, whilst formerly a large number of apparata were needed for mixing and separating, as well as arrangements for conveying."

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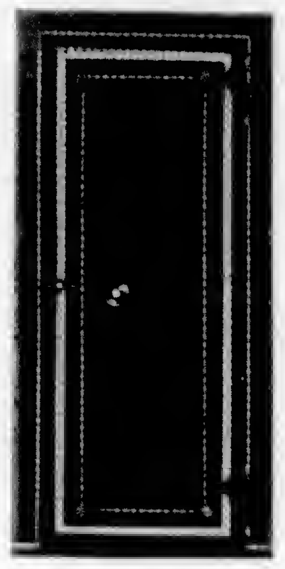

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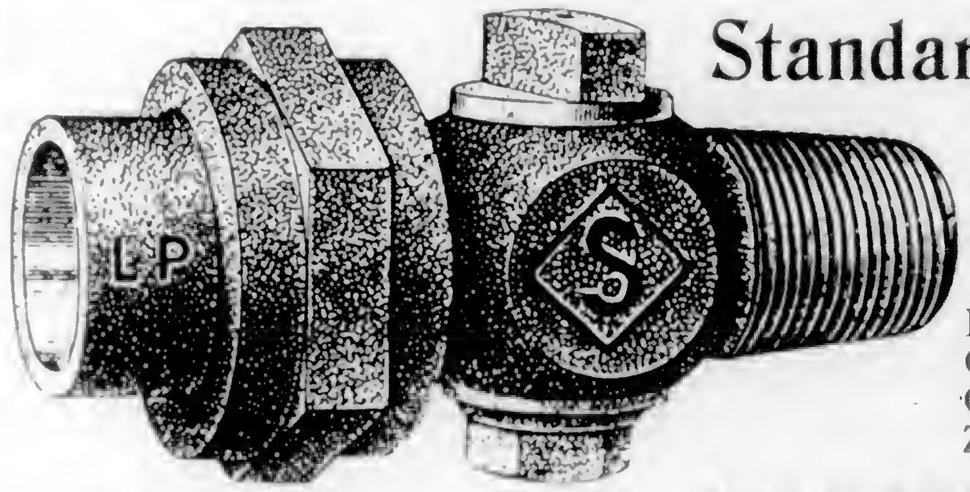

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Hercules Plaster Fibre, being purely of vegetable matter, is not affected by lime and is therefore durable and will not rot or decay besides being very strong. Lime does not destroy vegetation, while it will eat and destroy anything in the shape of animal matter. Lime is used to eat the hair off the hides while preparing them for the tanning process. Hercules Plaster Fibre, not being an animal matter but a vegetable, is, therefore, not subject to the action of lime. A canvass of the most practical plasterers has resulted in the unanimous verdict that Hercules Plaster Fibre is all that is claimed for it; and prominent buildings here, such as the St. Francis Hotel, Aronson building, Third and Mission streets, Merchants' Exchange building and a host of smaller buildings, testify to the excellent qualities of this fibre. There is not a city or town on the Pacific Coast without this fibre, and it is fast gaining favor in the East, as well as in British Columbia, where American products are not strong favorites.

The plant of the Hercules Manufacturing Company is at 423-431 Ninth street, near Harrison, San Francisco, and a cordial invitation is extended to all those interested in building operations to call at the factory and see the process of cutting, cleaning, separating and final packing, ready for delivery, in small bales, each of the correct proportion to mix with one barrel of lime. These small bales are also crated fifty in

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a bundle, making a neat and convenient package for shipping.

The manager of the Hercules Manufacturing Company is Mr. A. M. Sheakley, a plasterer by trade, who has devoted his life to the trade and to the perfection of the machinery used in the manufacture of this fibre.

* *

With the Sacramento Contractors and Building Crafts.

John W. Haley of 2014 Tenth street, Sacramento, is one of the best-known bricklaying contractors in the Sacramento valley. Mr. Haley has followed the trade for more than a dozen years, and has been in business for himself about half that period. Some of the most pretentious buildings in and around Sacramento have been constructed by him, including the Marshall Primary school, the Gormley building, the Odd Fellows building, the Clunie building, the Fox residence and the new home of Sacramento Lodge of Elks, now under course of construction. Mr, Haley, by the way, is a prominent member of Sacramento Lodge of Elks, and he is also Past President of Sacramento Parlor, Native Sons. One of the largest jobs undertaken by Mr. Haley out of town was the rebuilding of the Natoma Winery after its destruction by fire.

* *

Concrete construction is the coming building material, and nobody realizes this fact better than James McGillivray of 2319 G street, Sacramento. Most of the fine concrete sidewalks in the Capital City were built by Mr. McGillivray, and the concrete foundations and fire-proofing for such pretentious buildings as the Ruhstaller Brewery were put in by him. Mr. McGillivray also furnished all the mastic rock asphaltum for the brewery building. The foundations for the Sperry Milling Company's plant, the Phillips warehouse and the new W. P. Fuller building were put in by Mr. McGillivray. From now on he will make a specialty of fireproofing, and will bid on work both in and outside of Sacramento. Mr. McGillivray is the distributing agent for the well-known Cordelia rock.

* *

The Sacramento Planing Mill and Furniture Company has been doing business in the Capital City for about three years and has worked up a reputation that some of the older planing mills of Sacramento may well look upon with envy. The material turned out by the Sacramento Planing Mill is of a high class, which probably accounts for the company's pronounced success. A specialty is made of doors, windows, screens, mouldings, brackets and turnings. The company also makes a large number of beer chests, supplying the entire output for one of the large Capital City breweries. The company has done the mill work for quite a number of pretty homes, the two cottages at 19th and H streets, shown in this number, residence of Mr. Rasmussen and the F. L. Hansen flats in San Francisco being included in the list. The company's plant is at 6th and R streets, Sacramento. Its manager is R. W. Mill and its secretary is W. G. Forrester, both wide-awake and enterprising young men.

* *

Adolph Teichert is one of the busiest cement contractors in Sacramento. His residence and office are at 2401 J street. Mr. Teichert is best know as the manufacturer of artificial stone for sidewalks, residence foundations, etc. He has been in the contracting business in Sacramento many years. He was formerly with Goodman of San Francisco, the firm name being the California Artificial Stone Company. Mr. Teichert worked on the James Flood building in San Francisco, and on the residences of Charles Crocker, the Stanfords and the Hopkins. In Sacramento he built the "Bee" office, in so far as the cement and stone work was concerned, the John Breuner building and considerable work on the Capitol building.

* *

C. W. Dailey of 418 15th street, Sacramento, is making a specialty of store and office fittings and cabinet work. He has been in the contracting business in Sacramento for nearly a quarter of a century, and during that time has probably built close to a hundred cottages, besides many business blocks of a more or less pretentious character. He built the Mutual Supply Company's ice plant, which cost $32,000, and which is one of the best cold storage plants in the state. He also built the Marshall Grammar school, the Singleton building, at the corner of 5th and K streets, and the Weizel building, on the opposite corner. Mr. Dailey also built the storage plant of Clauss & Krauss, on 17th street, and he has been employed in remodeling quite a few business houses and churches.

* *

Fifteen years a bricklayer and brick contractor, is the record of George L. Herndon of 914 T street, Sacramento. A native of that city, Mr. Herndon has grown up with the town, and few men in the building trades are better known than he. He is a member of Sacramento Parlor, Native Sons, and is also a Red Man. Recently he was given the contract for the brick work on the new Red Men's Hall, to be erected in Sacramento this spring at a cost of $40,000. Among the buildings erected by Mr. Herndon in the past few years is the Ruhstaller Brewery, the Corporation House, the Morehead building at Chico, brick building for Belfour, Garret & Co., at Grimes' Landing, Colusa County, and a sherry house for J. B. Bradford & San at Bruceville. One of the most recent structures to be completed by Mr. Herndon is a 250-foot store building at Auburn from plans by Architect T. Patterson Ross of San Francisco. Mr. Herndon was at one time foreman for Thomas Whitehead, contractor for the Southern Pacific Company, in the Pacific Improvement Company's work.

* *

The Palm Iron Works at Sacramento supplies practically all the iron and steel work for the big buildings in and around the Capital City. The company has lately moved into its new building at 15th and K streets and is now in a position to handle big orders at short notice. Besides ornamental and structural iron and steel the company does a large business in iron doors, grating, fences and wire work of all kinds. Mr. Palm was the lowest bidder for the iron and steel work on the State house, which is shortly to be fire-proofed and strengthened from plans by Sutton & Weeks of San Francisco.

* *

G. Edward Hook, successor to Hook & Son of Sacramento, is acquiring quite an enviable reputation as the builder of residences and bungalows. He is making a specialty of this line of building. Mr. Hook has erected a number of houses, built partly of shingles and partly in rustic effect, and this class of homes has proved especially popular. Besides residences, Mr. Hook

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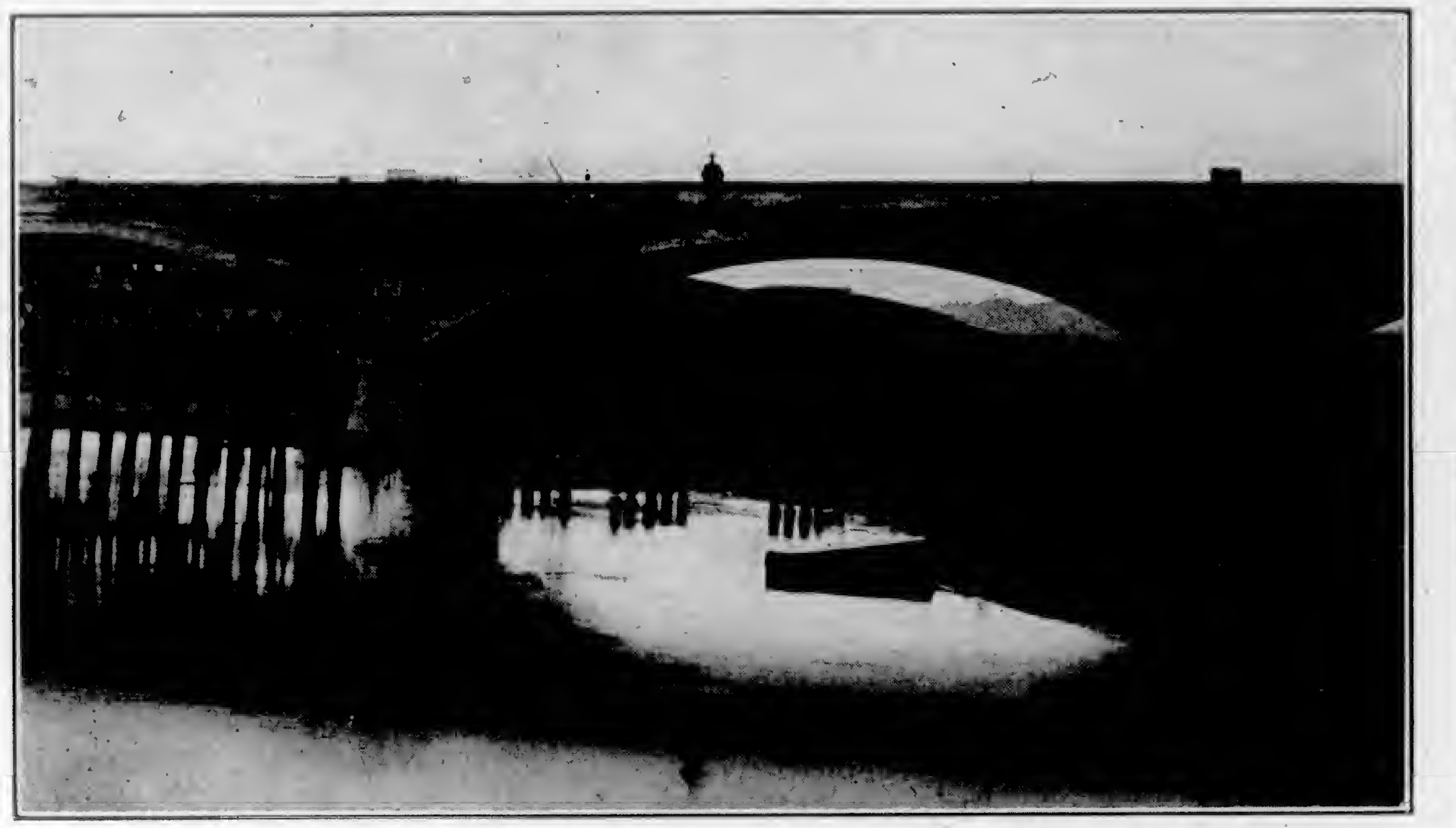
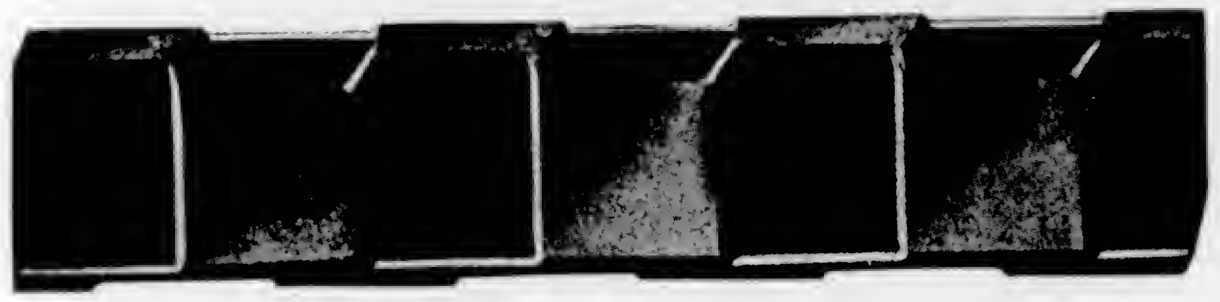


Concrete Bridge at Pollasky, Cal., Ten 75-foot Spans, Reinforced with Corrugated Bars, Designed by Jno. B. Leonard, C. E.

CORRUGATED STEEL BARS FOR REINFORCED CONCRETE



These bars are carried in stock in San Francisco and can be furnished in any length up to 30 feet. Special designs for any class of work in reinforced concrete furnished free of charge.

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does quite a little work in flat building and store and office fitting.

The following is a partial list of last year's building by Mr. Hook: H. C. Keyes, residence, M, 24th and 25th streets; Chas. Mier, bungalow, 16th, M and N streets; Geo. Hignett, four apartment house, 12th and O streets, two flats, 12th and O streets; Chas. F. Howland, ten-room residence, J, 28th and 29th streets; William Greene, six-room, shingle and rustic, two-story cottage, 23d and P streets; Dr. Chas. Van Norden, $7,000 bungalow on Aeolia Heights, Auburn, Placer county, Cal.; Mr. O. C. Schultze, residence in Dixon, Solano county, plans drawn by R. A. Herold.

✣ ✣

Sinclair & Bessey of 513 J street, Sacramento, architectural sheet metal workers, furnace men and ventilating engineers, hold the foremost position in Northern California in their line. The firm's large plant enables them to undertake and complete work of no small magnitude. Up-to-date specifications embody many features unknown to the trade twenty-five years ago, wood and cement ornamentation being replaced with artistic designs in galvanized iron, copper and zinc. The architect must have implicit confidence in the ability of the metal worker to appreciate and carry out the detail of the work. Sinclair & Bessey enjoy the reputation for correctness in interpreting the architect's plans and carrying out the work satisfactorily. During the past five years this firm has finished the metal work on the following buildings in Sacramento: Capitol Hotel, Gormley building,

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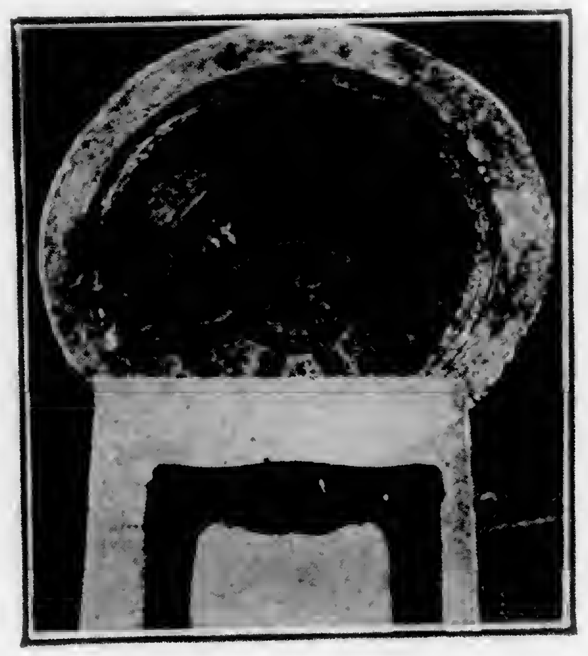

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Phones, Capital 984. Bell Main 690

Corporation House, Odd Fellows' Temple, Turner Hall, and the Odd Fellows' Hall, Lincoln. To have completed such work for a gentleman of Mr. Herold's exacting superintendence is a sufficient testimony that Sinclair & Bessey have the undoubted ability to handle work intelligently and practically. This firm has inaugurated a special department to handle the heating and ventilation of buildings, and their long experience enables them to give the best results.

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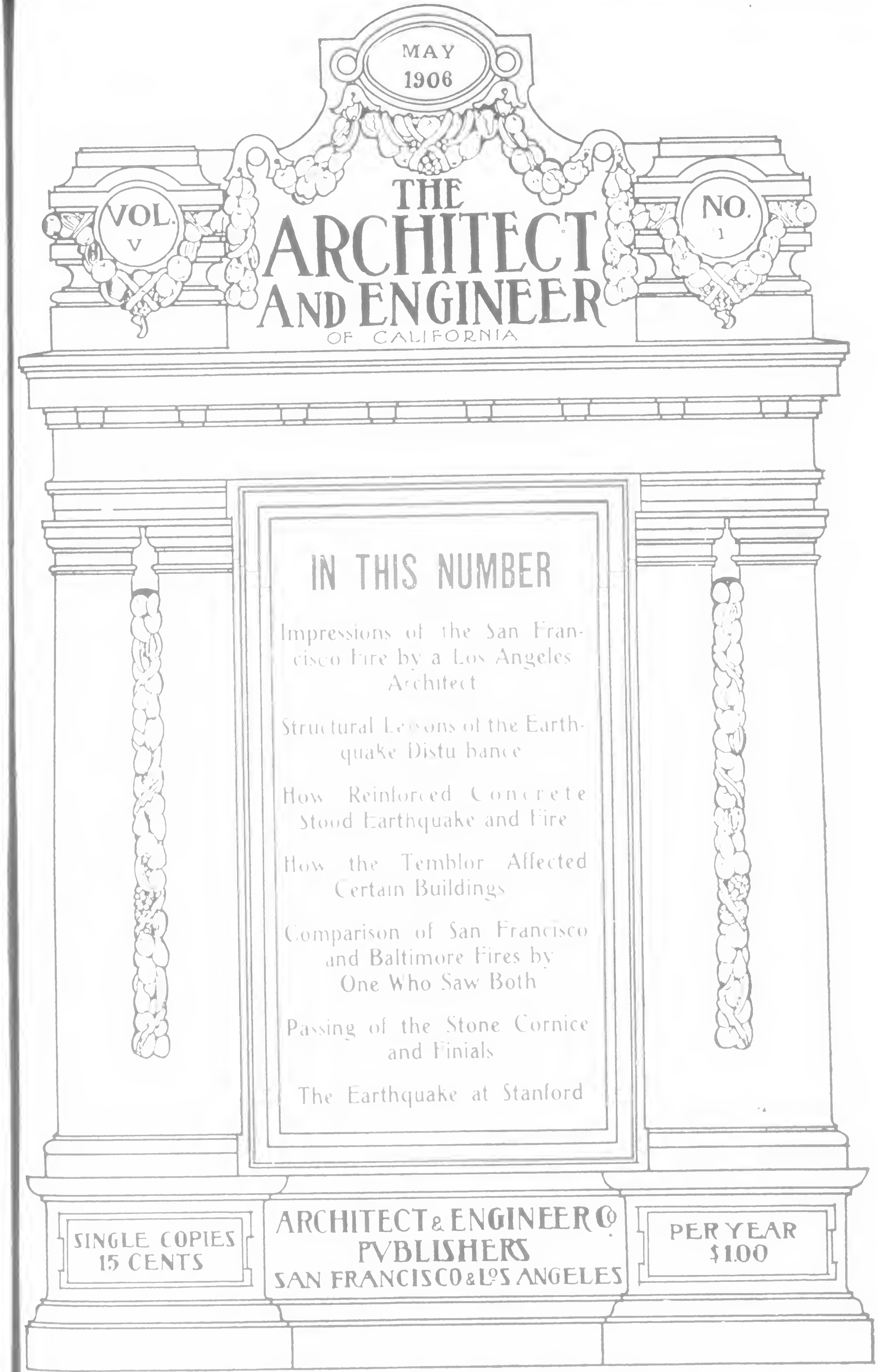

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NO.
1

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IN THIS NUMBER

Impressions of the San Francisco Fire by a Los Angeles Architect

Structural Lessons of the Earthquake Disturbance

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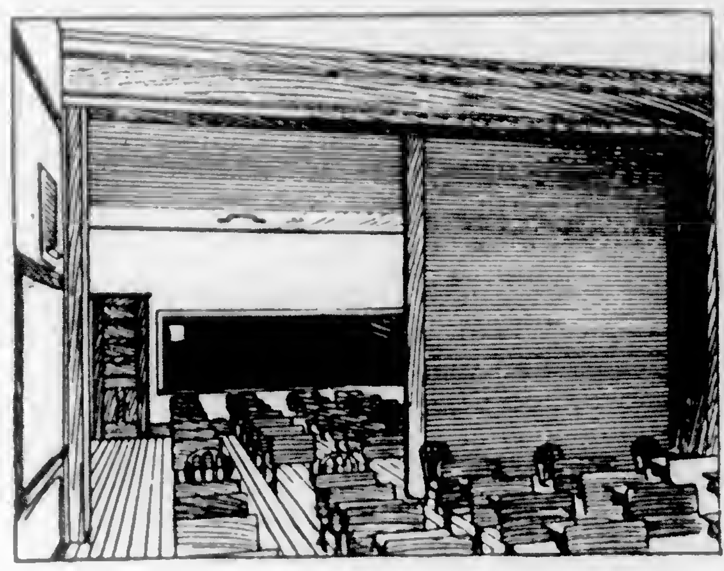

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Contents for May

Frontispiece—Ruins of San Francisco City Hall

A Los Angeles Architect's Impressions of the San Francisco Earthquake and Fire . . . . *By Octavius Morgan, Architect*

How the Earthquake Affected Certain Buildings . *By Maurice Couchot, C. E.*

Structural Lessons of the Earthquake Disturbance . *By Charles Derleth, Associate Professor of Structural Engineering, University of California*

An Example for Reinforced Concrete Advocates . . . . *By Ralph Warner Hart, Architect*

Reinforced Concrete in the Earthquake . . . . *By William B. Gester, C. E.*

No High Line For Buildings.

How Reinforced Concrete Stood Earthquake and Fire . . . . *By John B. Leonard, C. E.*

San Francisco and Baltimore on Fire . . . . . *By A. Dodge Coplin, Architect*

Forty Men to Plan New City.

Lessons of the San Francisco Earthquake and Fire . . . . *By Charles W. Dickey, Architect*

Says Owners are at Fault . . . . *By A. O Johnson*

Passing of the Stone Cornice and Finials . . . . *By Harry Larkin, Member of Technical Society of the Pacific Coast*

The Earthquake at Stanford.

EDITORIAL—
- The New San Francisco . . . . *By F. W. Jones*
- The Man of the Hour.
- Mr. Burnham's Plan . . . . *By John Galen Howard, Architect*
- Reinforced Concrete in the New City.

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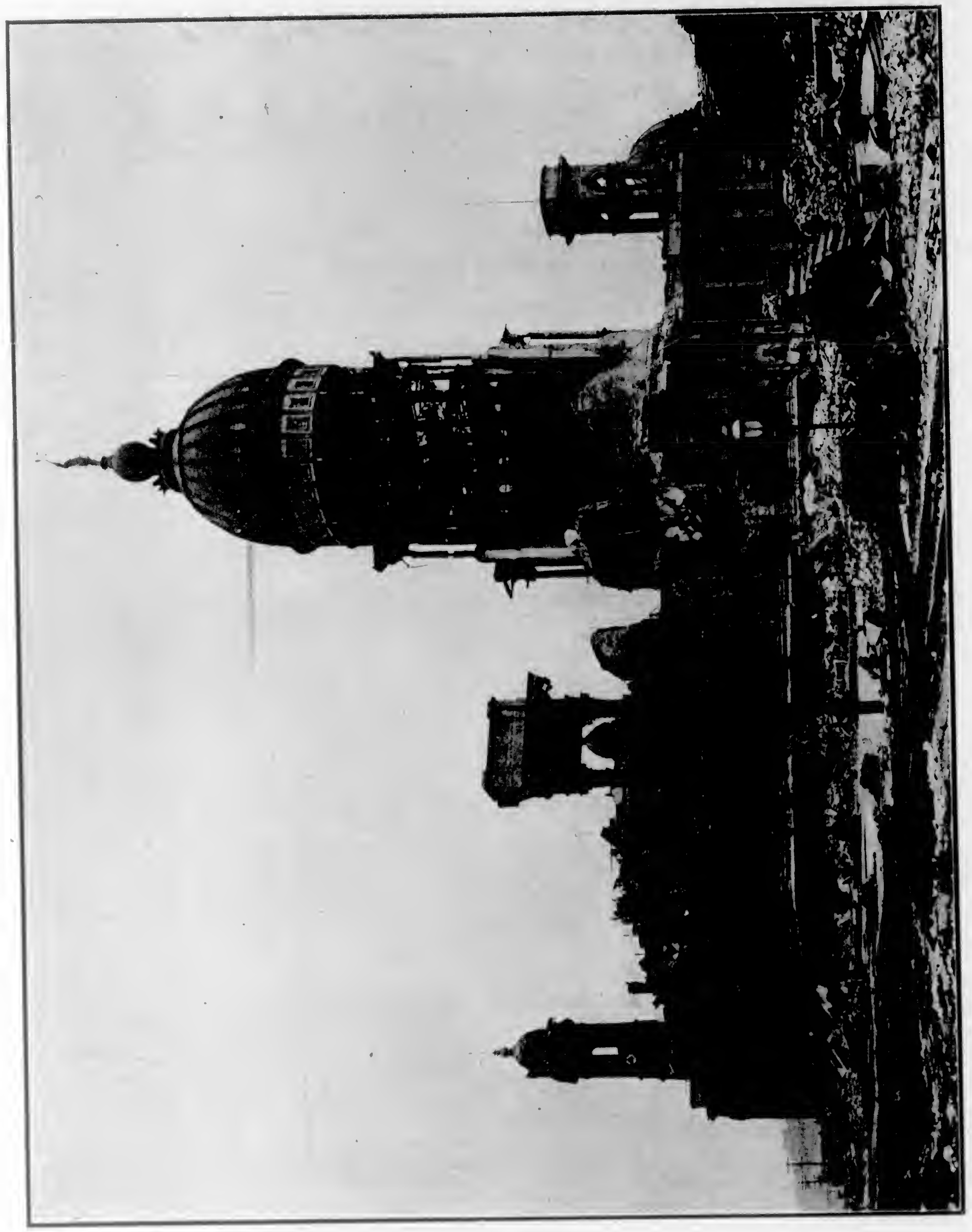


San Francisco City Hall. This Magnificent Structure Was Partly Demolished by the Earthquake, Fire Completing Its Destruction.

THE
Architect and Engineer
Of California

VOL. V. MAY, 1906. No. 1

A Los Angeles Architect's Impressions of the San Francisco Earthquake and Fire.

By OCTAVIUS MORGAN, Architect.

PERHAPS, while a little long-winded, the best way for me to give my impression as to the fire and earthquake, is, to describe what I have seen and where I went.

On receiving the news in Los Angeles, Wednesday morning, April 18, that a great earthquake had occurred in San Francisco, at 5:20 a. m., I immediately secured a ticket for the first train for San Francisco, leaving Los Angeles at 3:30 p. m., having a great desire to see the effect of earthquakes on buildings of modern construction, that is, steel frame buildings in particular, and also, if possible, reinforced concrete structures.

By the time the train started, we heard that fire was raging in San Francisco, and possibly the entire city would be destroyed. I found on the train many excited San Francisco people.

We arrived at Tracy the next morning (the 19th), at 7 o'clock. Here we saw the first effects of the earthquake. The water tank had been shaken down, the cast iron columns broken, and the bottom plates which rested on the concrete piers had shifted. Whether this was done by the earthquake or the thrust when the tank fell, I could not say.

At Contra Costa a Federal officer came through the train and notified all passengers that they would not be permitted to go to San Francisco by the way of Oakland pier, the military having entire control of the city, and only those who could show official permit, would be permitted to enter; that the only point of entry into the city was on the south by way of Valencia street, and only then when good cause could be shown.

At Sixteenth street, Oakland, the train stopped and all turned out. We made up our mind we would try to get across by hiring a boat or some other means. Mr. O. C. Morgan of the Morgan Oyster Company, was on the train and came up to our little party and became one of it. We discussed ways and means to get into the city, he on account of business interests and I from curiosity, to see the effect of the earthquake and the fire that was now raging. I suggested to my namesake, Morgan, that he might get one of his oyster boats to take us over. He thought it would be impossible to make arrangements this afternoon, it being now about 3 o'clock, but would make arrangements for tomorrow.

That night we went up to Pleasanton, some thirty miles away, to stay, Oakland being so full. There we had canteens filled and lunches put up, and we started on the first train in the morning, which was stopped way up in Oakland, the train not going down to the water front.

Incidentally I would say here, that that Thursday afternoon I walked through the city of Oakland, up Broadway and through the center of the city. We noticed as we went along that all chimneys had been shaken off, excepting a few that were north and south—lengthwise. This showed clearly that the shock was from north to south. When we got up into the city where the brick buildings were, we found the front walls of many shaken out into the street, corners cracked, fire walls generally shaken off, and cornices down, that is, terra cotta or brick cornices of the poorly-constructed buildings. The schoolhouse tower of wood was twisted around and columns twisted out of shape. When we got right up into the business part, we dropped off the street car to make closer examination. I quickly saw that the best buildings were the least damaged, that the inferior-constructed buildings, whether brick or wood, were the ones that were damaged by the earthquake.

I hunted up the twelve-story steel-frame bank building, it being the only one in the city. I found the sidewalk enclosed, to keep people from walking close to the building. At first glance there was nothing to show that any harm had been done to the building, but on closer examination, I found cracks in the stone facing of the building, more particularly about two-thirds of the way up. I could see evidence of the plaster being shaken off from the ceiling of the interior of a number of rooms, and on the north side, the relieving arches over the windows in the brick wall had shaken out in many cases. Possibly the steel frame may have a kink in it about two-thirds of the way up. This can only be determined by stripping the building at this point. This satisfied me of the safety of steel-frame buildings under earthquake shock,—not preventing them from being damaged, but preventing them from being destroyed.

It was reported to us that some four or five persons had been killed by falling brick. The city was under martial law—all banks and saloons closed and steps taken for relief, especially of the refugees from San Francisco, who were coming over in great numbers. Tents were being set up in the park and food depots established. We came to the conclusion that Oakland would be full that night, and so, pulled out, as before stated. We did think of going down to San Jose and coming up by the Coast Line, but heard that bridges were destroyed and the line twisted out of shape. We also heard that the shock of the earthquake had been great at San Jose, and at all other points on the Peninsula, especially in the neighborhood of Stanford. We heard that between two hundred and three hundred lives had been lost in San Jose and neighborhood, that many large buildings had been shaken down, and that at Stanford University all the principal buildings had been shaken down—the Gymnasium, the Library, the Chapel, and the Triumphal Arch—and about one-half dozen persons had been killed and injured there. My son Octave was at Stanford, but not seeing his name among the list of injured or killed, I concluded he was all right, and was anxious to see him to get his report, and at once wrote him to be sure to get into San Francisco and take in the effect of the earthquake and fire.

We further heard that the shock had been severe right up the Salinas Valley, and had jumped across the bay to Santa Rosa, a small place of 8000 or 10,000 inhabitants, where the damage by the earthquake was more severe than at any other place, in proportion to population.

Pleasanton—which is truly named—is on the rising ground up Niles Canyon, towards Mt. Diablo. We found here no evidence whatever of the earthquake. And this I would say, that I found that the earthquake had not had much effect on buildings built on solid foundation,—bedrock; but had been most destructive in filled, alluvial and sandy soil. Even where the buildings were erected on piles, they stood well.

As I said before, Friday morning when we got down to Oakland and found there was no way of getting out to the pier, we made a break for Oakland Creek, thinking we might find some way to get over. When we got to the water edge we found a tugboat pulling out,—in motion. We jumped on. They did not throw us overboard; so we were able to make a landing about one-half mile south of the Ferry slip. The tugboat was loaded with big puncheons of fresh water.

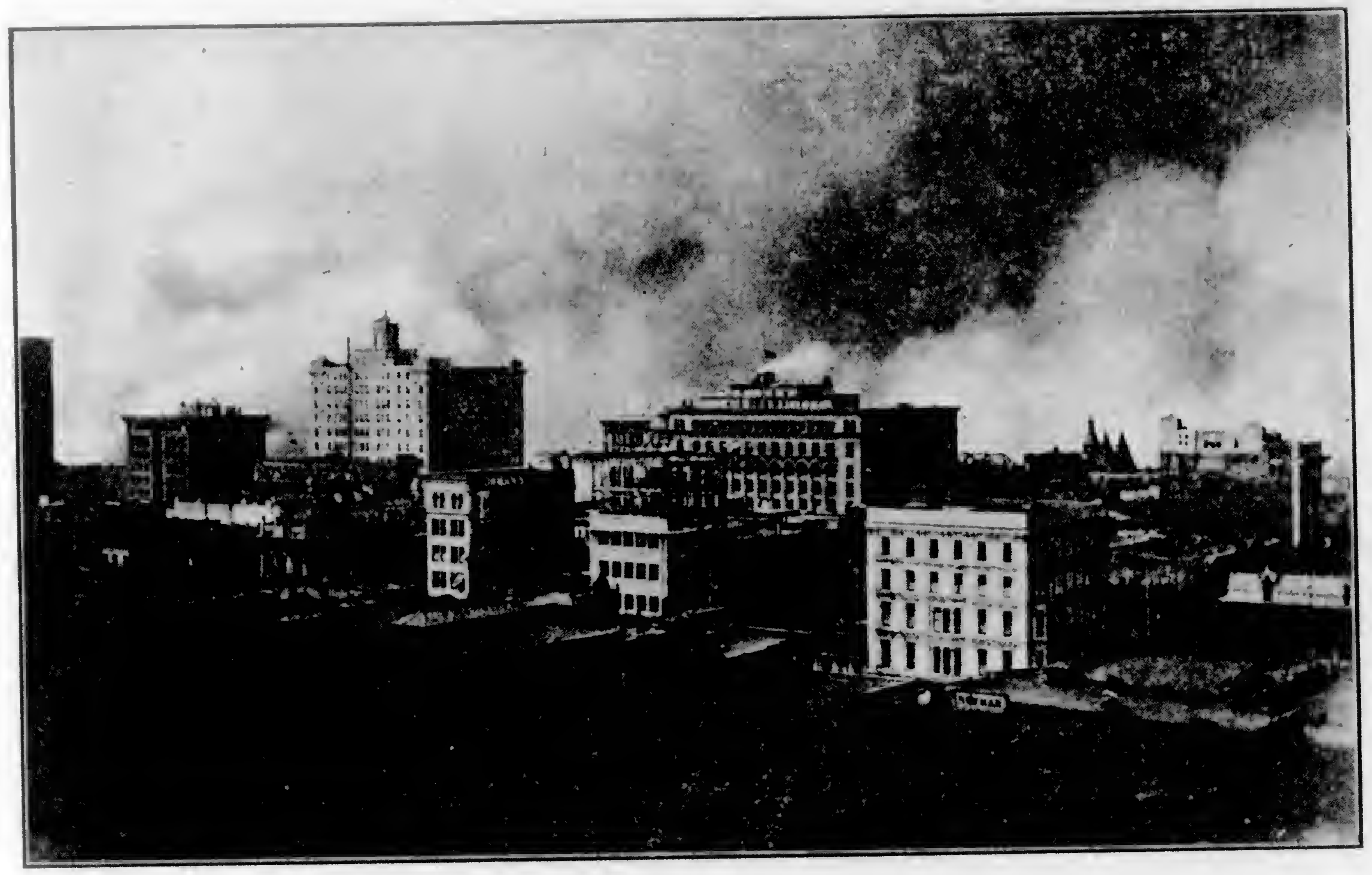
Where we came out on the cobble-stone front, from the pier, we found quite a number of old brick buildings standing, but badly shaken up by the earthquake. These buildings were only two stories high. The fire had burned right up to the back of them, and everything along that side of the street was burned clear, as far as I could see to the north and to the west,—the big fire-proof buildings looming up in the distance. To the south, on the hill, was the brick Sailors' Home, apparently intact, and on close examination I found only one chimney shaken down. This building was founded on bedrock.

We presently came to the Folger Coffee Company, corner of Spear and Howard. This building had escaped the fire, fire burning up to it, across the street and behind it. This building was partly four stories and partly six stories in height, and a brick structure. I had occasion later to examine it closely, going through it. It was undamaged by fire, but the earthquake had shaken down the smoke-stack and had cracked the building at the junction of the four and six-story parts, and had thrown out the fire walls on the south side and four-story portion, the fire walls not being anchored. This building was a well-constructed brick building, supported on piles driven about forty feet.

The six-story portion had an interior steel frame, but no steel in the outside wall, the joist being wooden, except the fifth story which had steel beams for its principal members and reinforced concrete for its inferior members, and a reinforced concrete floor covering the entire area. Above this was timber construction for the interior. This reinforced concrete floor, in my judgment, acted as a diaphragm to stiffen the building and hold it in shape, preventing it from rocking out of square and preventing serious damage from the earthquake. This portion of the building was used for their coffee-roasting and manufacturing purposes. The concrete floor had been put in as a fire-proof floor to cut off the coffee roasting department.

The adjoining four-story building was used for warehouse purposes, and had a full steel frame, the brick walls of the exterior being built in and around the steel columns and beams; the floors were reinforced concrete floors, the principal beams being steel, the inferior beams being reinforced concrete, spacing about three feet centers. This building was not damaged in any way by the earthquake, excepting the south fire wall, which, as I said before, was shaken off, it being merely a temporary wall, put on until such time as the building would be extended in height,—the building being planned for this purpose. The warehouse was heavily loaded with coffee. The stories were quite low,—about nine feet. As before said, the only damage was at the junction of the four and six-story portions. This again confirms my idea that well-built buildings will resist quite a severe earthquake shock.

We now turned north, along the water front, coming to the Ferry Building. Here I found the stone work of the tower, above the roof line—which appears to have been the bending point—loosened up, and several



Skyscrapers After the Earthquake and Before the Fire, Showing Comparatively Little Damage by the Temblor.

pieces shaken off; otherwise the tower did not appear to be injured structurally. The flag-pole was bent over like a whipstock, to the north.

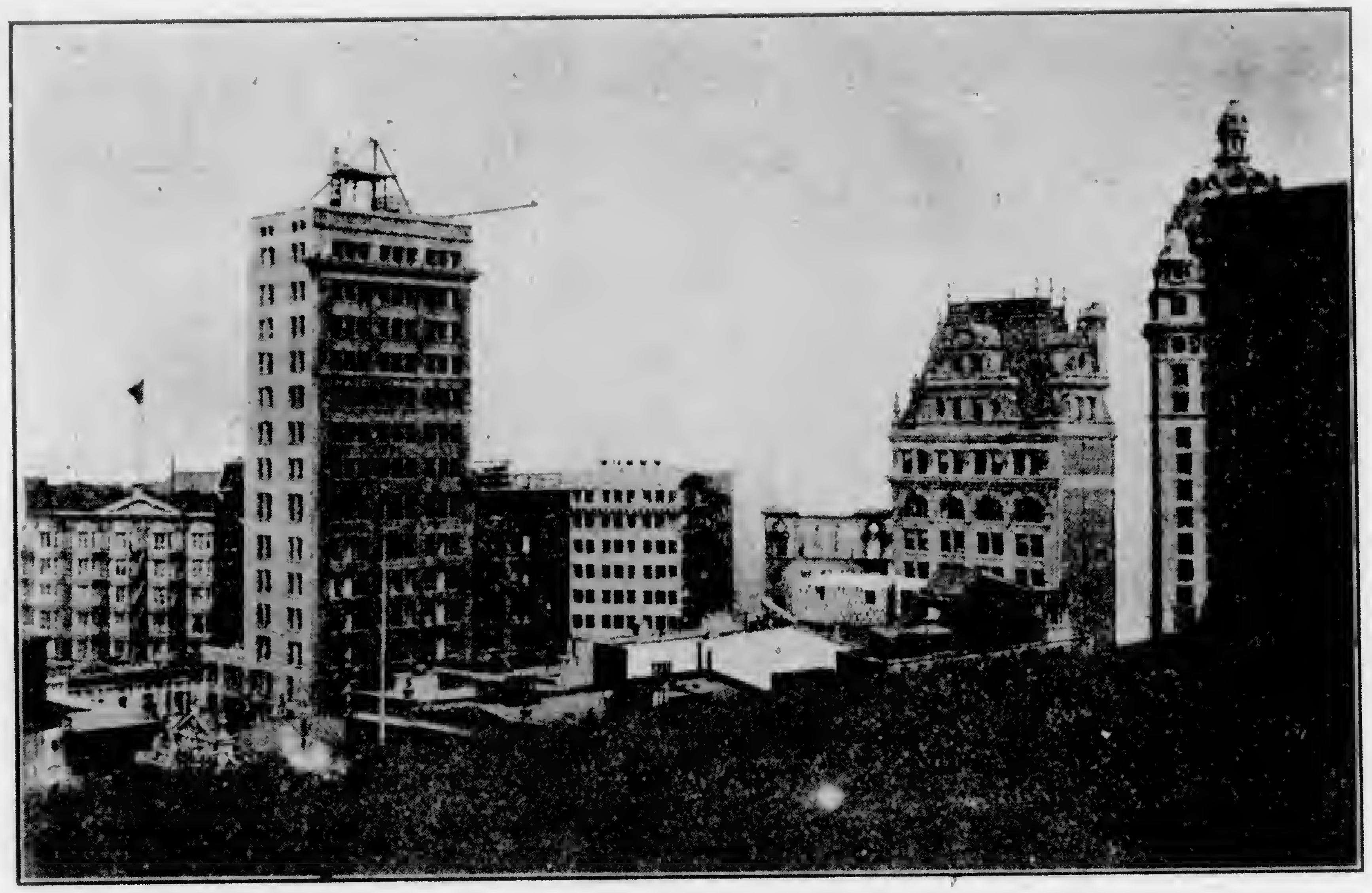
I noticed here that several sheds on the pier had been shaken down,—insufficient bracing or underpinning.

We went along until we came to about Jackson street. From here on to Telegraph Hill were quite a number of warehouses and wholesale houses yet unburned. The fire was eating into them towards the north very rapidly. I walked along the street by the side of many of them, looking for the effect of the earthquake. The newer and best-built buildings, even four stories high, did not show much, if any, effect of the earthquake. The older buildings had their fire walls shaken down, and showed other minor evidences of the earthquake.

One four-story building that was in possession of the soldiers and from which they were taking crackers and other foodstuffs, I noticed particularly. It appeared to be in good condition. And I noticed another four-story brick that was in good condition. In fact, here was another evidence that where buildings were on solid foundation, they stood the earthquake shock best. These buildings were hugging close to the foot of Telegraph Hill, which is merely a rocky upheaval.

We came to the Globe Flour Mills and the lumber yard around it. Being acquainted with the proprietor of the mill, I went into it and made quite a close examination. It did not show any evidence of damage from the earthquake. The first story of a portion of it was of concrete construction, the upper portion brick. This was supposed to be a fire-proof building. Here I left my coat and traps, intending to make it a rendezvous, and then zig-zagged back up towards town, going by the unburned buildings and keeping shy of the soldiers guarding the different buildings and blocks.

We went along Battery street, through the burnt ruins, by the Custom House. This I closely examined later. It is a four-story building, with streets on three sides and a vacant excavation for the new Custom House on the east side. I found that this building had not been injured, as far as I could see, by the earthquake, nor by the fire, excepting the wood door on the north side, which was blistered. I found that the buildings across the street, to the west, were not burned, but had been shaken up by the earthquake. They were old buildings, but not seriously wrecked. And diagonally across the street, on Jackson street, I saw a new four-story brick building that was undamaged either by fire or earthquake. The upper portion was unoccupied.



Another View of San Francisco Skyscrapers After the Earthquake and Before the Fire.

My conclusion is, that the Government regulation and method of building is best both for fire and earthquake; but while the buildings are fit for their purposes, they would not be generally advantageous for general commercial usage. This Government building, as usual, was of low stories, slate roof, very heavy walls, and small windows, deeply recessed. This recessing prevented the windows being broken by the heat, as only the rays coming at right angles to the building could strike the glass. This building constructed on piles, was a substantial, heavy, brick building, the walls being about two and one-half feet thick, and is evidence that a heavy monolitic structure is almost earthquake proof. Perhaps, being on pile might have helped it, the shock being lost, although one would think the contrary would happen.

We pushed on through the burnt ruins to California street, looking at the Mutual Insurance building, an eight-story fire-proof building. This retained its form, though entirely gutted by fire. All other structures around it were destroyed, and as far as eye could reach, to the east and south.

We are now getting amongst the fire-proof buildings. The next was the fourteen-story Merchants' Exchange, an immense building, completed about twelve months. It retained its form, though gutted by fire. The plastering and everything inflammable were destroyed, and other damage done, though, as far as I could see, the building is structurally unimpaired. The floors in this building were reinforced concrete floors; the fire-proofing of the columns, tile.

Across the street was the building occupied by the California Bank, and other three and four-story buildings. These were destroyed. The wall of the one next to the beautiful one-story Merchants Trust Building, had toppled over onto it and crushed through the roof. This little building was gutted, but can be quickly repaired. Adjoining this one-story building on the west is the twelve-story Hayward building, or, as it is now known, the Kohl building. Apparently it was intact, the earthquake not making any visible marks, except a few stones in the facing were cracked, but the fire had blackened it and gutted the three or four lower stories. Above that the rooms can be quickly made ready for occupancy. This building had finished cement floors and metal-covered finish. The Merchants Exchange, across the street, had wooden floors over the concrete, and wood finish. It was subject to greater exposure and heat than the Hayward building, having a lot of six and eight-story, wooden-joist buildings around it, on the east and south, from which the fire found its way to the inside, through the windows, the alley on the east being only about ten feet wide. The Merchants Exchange building really acted as a screen across the street to the Hayward building, and the one-story Merchants Trust building also served to protect the building, by the fifty-foot open space on the east; California street on the south and Montgomery street on the west also protected the building. And due allowance should be made for this, in comparing the destruction in the Merchants Exchange and in the Hayward building.

On the Mutual Insurance building, I assume the loss to be about seventy per cent; on the Merchants Exchange, forty to fifty per cent., and on the Hayward building, ten to fifteen per cent.

Looking north on Montgomery street, towards Chinatown, everything had been destroyed by fire, though the walls were standing generally.

The Hall of Justice showed very seveley the effects of the earthquake, all of the enclosing stone work on the tower being shaken off and the steel frame left exposed, supporting the dome at the top, which was little damaged; the bending point appearing to be at the junction of the roof, above that being shaken off.

We noticed the old California Safe Deposit building was totally gutted, —the exterior walls left standing. Across the street, on either side of California, everything was gone, the walls of the German Savings and Loan Society building being standing, but the interior destroyed. Everything to the right and left was gone, and forward, as high up the hill as could be seen, excepting that the walls and tower of the brick Episcopal Church were standing, but the interior was gutted by fire. This was another evidence that solid foundation was a good thing.

We turned north on Kearney street to Pine, down Pine to Montgomery, to the Mills building. Here we could see but little effect of the earthquake, but the fire had pretty thoroughly gutted the building. This was supposed to be a first-class fire-proof building. We noticed the tile on the underside had fallen off in many places, and we have since heard that nearly all of the built-in safes above the first story, had been ruined and contents destroyed. I should judge the damage to the Mills building was fully fifty per cent.

Across Pine street the old Stock Exchange building left nothing but a heap of brick. It was totally destroyed. The front of this building was of granite, and it was a very solid structure, some six stories in height.

We noticed the Nevada-Wells-Fargo Bank building and all the other old buildings around it. These were of wooden-joist construction and had all been ruined and destroyed by fire. The vaults apparently, though, were intact.

We keep along Montgomery to the Union Trust building. This building showed little or no evidence of the earthquake, but fire had gutted it. The lower or bank floor was least uninjured,—all wood work being burnt out and plastering gone. The first story and basement were the least hurt. I should judge the building was damaged about twenty-five per cent. This building was protected on the east by the eight-story standing wall of the Hobart building, which building had been destroyed by fire, but this wall was left standing. The Union Trust building was protected on the west and east by the open spaces of Montgomery street and the wide junction of Market and Post streets, and by the ten-story Crocker-Woolworth fire-proof building. This building, the Crocker-Woolworth, was apparently uninjured by the earthquake, but was damaged by fire, possibly from twenty to twenty-five per cent.

Across on the other side of Market street everything was gone flat. East of New Montgomery street, the old Palace walls stood up, in almost perfect condition. The building, which was seven stories and basement in height, was entirely gutted by fire,—nothing left standing but the walls. This building had many cross walls, and from my best information, had bond irons built into the walls. It certainly stood up well under the earthquake shock, and from my best information, was not materially injured structurally by the earthquake,—plastering being shaken off and skylights broken.

Across the narrow alley to the west was the Monadnock building, just ready for occupancy,—the lower stores occupied. This building was steel-frame construction, with reinforced concrete floors and reinforced concrete beams and steel girders and expanded metal partitions, the walls on the narrow street and rear being twelve-inch walls, self-supporting, resting on their own foundation and built in between the columns, but not supported on the girders. The side wall stood intact. The rear wall was gone. They had used dynamite on the building immediately in the rear, and this, I think, caused the destruction of the wall. The stone facing on this building was shaken up by the earthquake, otherwise the building appeared to be structurally intact. Upon the west was a vacant lot, upon which they were building an annex to this structure. To the west of this was The Examiner building, a pile of debris.

Across Kearney street, on the corner, was the beautiful seventeen-story Call building. It held its shape apparently to the eye. But all interior combustible material was destroyed by the fire, and the interior stone work badly chipped and mutilated by fire, especially on the east and south sides, from the burning building on the south, which building was destroyed. The visible evidences of the earthquake were from two-thirds of the way up, where the stone was broken, and at the springing of the dome, where the balustrading and other ornamental work were forced off, and at the base, where the sidewalks were uprooted out of shape. How much structural damage was actually done to this building can only be told by stripping. I noticed in this building that the arches were concrete arches, built in between I-beams, about a three or four-foot span, that the columns were fire-proofed with tile, which had spalled off in many cases, though I believe the fire proofing was sufficient to prevent structural injury. On the west were two other fire-proof buildings, which were little damaged by the earthquake, but were burned out by the fire. On the face of it, I should judge that the Call building was damaged about fifty per cent.

Across the street, on the north side of Market street, we have the fourteen-story Mutual Savings Bank building. This beautiful little building, while retaining its shape, was ruined by fire, the combustible buildings on either side causing its destruction. I should judge the loss on this building would go fully fifty per cent.

On the opposite corner of Kearny and Market stood the Chronicle building. The old building, some ten stories in height, was gutted, the exterior walls standing, but the entire interior was cleaned out like a funnel. Whether this was caused by the fire or the shock of the earthquake, I do not know. In the section right on the corner, all the interior beams were piled in the basement, from the upper stories, rivets being sheared.

On Kearny street to the north was the new sixteen-story annex to the Chronicle. This was not completed, but the fire had burned out what little wood work there might have been in it. The earthquake had apparently shaken it up, the visible evidence being the shaken and cracked brick pier facings, and about two-thirds of the way up. This appears to be the bending point on all of these tall buildings,—about two-thirds of the way up, the brick work and stone work being crushed, cracked and broken at this point. I should estimate the loss on the old Chronicle building to be about eighty per cent.

Went north, up Kearny street, about two blocks. There I found a new eight-story structure, The Marsden building, incompleted, with reinforced concrete floors and all steel work fire-proofed solid with concrete. This building apparently had not been damaged by the earthquake, but the terra cotta trimmings on the outside had spalled off on account of the heat, and what little wood work there was in the window frames had been burnt out. All other buildings immediately around it had been destroyed by fire, they being wooden-joist construction.

The building on Post street, owned by the Crockers, and occupied by the Sloane Furniture Company, had all the exterior walls standing in good shape. The interior was burnt out by fire and wrecked apparently by dynamite, the columns apparently sinking into the ground, carrying down with them all the beams and floors to a center.

I understand that dynamite was used indiscriminately on fire-proof and non-fire-proof buildings, the men handling it not being familiar with the construction of the buildings,—a useless waste of property.

I turned back on Market street, down Montgomery, to the Rialto building. Knowing this to be a fire-proof building, I was surprised to see this a wreck. The exterior walls were all standing, apparently in good shape, but the interior columns and beams were sunk into the basement, and the building was open from the basement to the sky. Here again I was told that dynamite had been injudiciously used. While the fire might have destroyed everything burnable in the building, yet I think, had it not been for dynamite, the building would remain structurally intact. This building was fire-proofed with concrete and had reinforced concrete floors.

Across the street were the remnants of the Crossley building,—a pile of debris, as were all the buildings in this neighborhood, excepting an eight-story fire-proof building, on the opposite side of the street, which had not been badly damaged by fire, but had been shaken up by dynamite; the lower story not being burnt out, but the windows were destroyed and the east wall very much cracked. This was a very narrow building, not more than forty feet wide. Some said the cracking of this wall was caused by dynamite, used on the adjoining building which had been blown to smithereens.

Going west on Mission street to Third, we came to the Abramson building, a fire-proof structure. This retained its shape, though gutted by fire. And here we can look into the rear of the fire-proof buildings adjoining the Call building on the west. The rear of these buildings had been wrecked by dynamite.

Getting back on Market street, traveling west, I find the walls of the Phelan building standing,—everything else gone. And on the south side of Market street all that remained of the magnificent Parrott building, the Emporium; the front wall was standing intact, otherwise the building was a ruin. The two lower stories of this building were fire-proof construction, and above that, steel columns and girders and wooden joist. The loss on this building was probably ninety per cent.

Now, we come to the great Flood building, on the site of the old Baldwin Hotel, twelve stories in height. This building was damaged on its exterior facing by the earthquake, the northwest corner of the first story stone facing being very much shaken up. The east wall did not show any sign of a crack, being entirely exposed to view. The fire damaged all the rooms on the street side,—possibly three-fourths of the entire number of rooms, and entirely gutted the first story. The bottom of the tile arches, and the tile fire-proofing columns, in some places, had fallen off. The Western Banking room on the corner of Market and Powell, while greatly damaged, could be put in shape for use very quickly. The safe deposit room in the basement was little damaged.

Up Ellis street stands the Hamilton Hotel, a building ten or twelve stories in height, very narrow, being not more than forty feet wide. This holds its shape well, but was entirely gutted by fire.

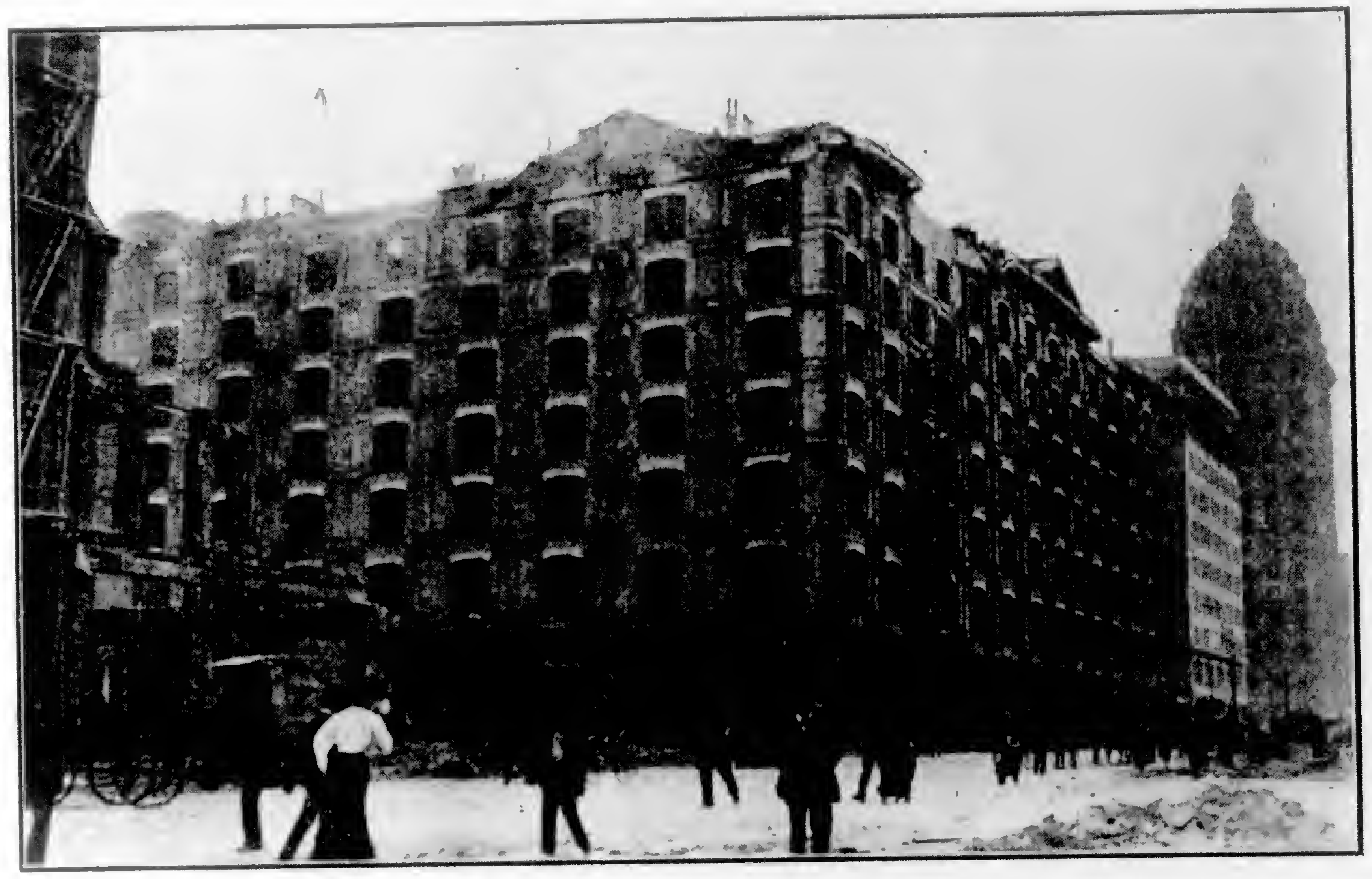
Going up Powell street to the St. Francis Hotel, we find the fire had gutted this beautiful structure, and the earthquake left its marks by shattering the stone facing, the bending movement of the structure to the north and south apparently crushing and cracking the stone facing and brick work, in the same manner as the overloading of a brick or stone pier.

All the buildings around Union Square are gone. The new steel frame of the Butler building, being some eight stories high, just up, the lower story partly enclosed with masonry, at the corner of Stockton and Geary, was standing in good shape, apparently uninjured by the earthquake or fire. This can only be definitely determined by close examination.

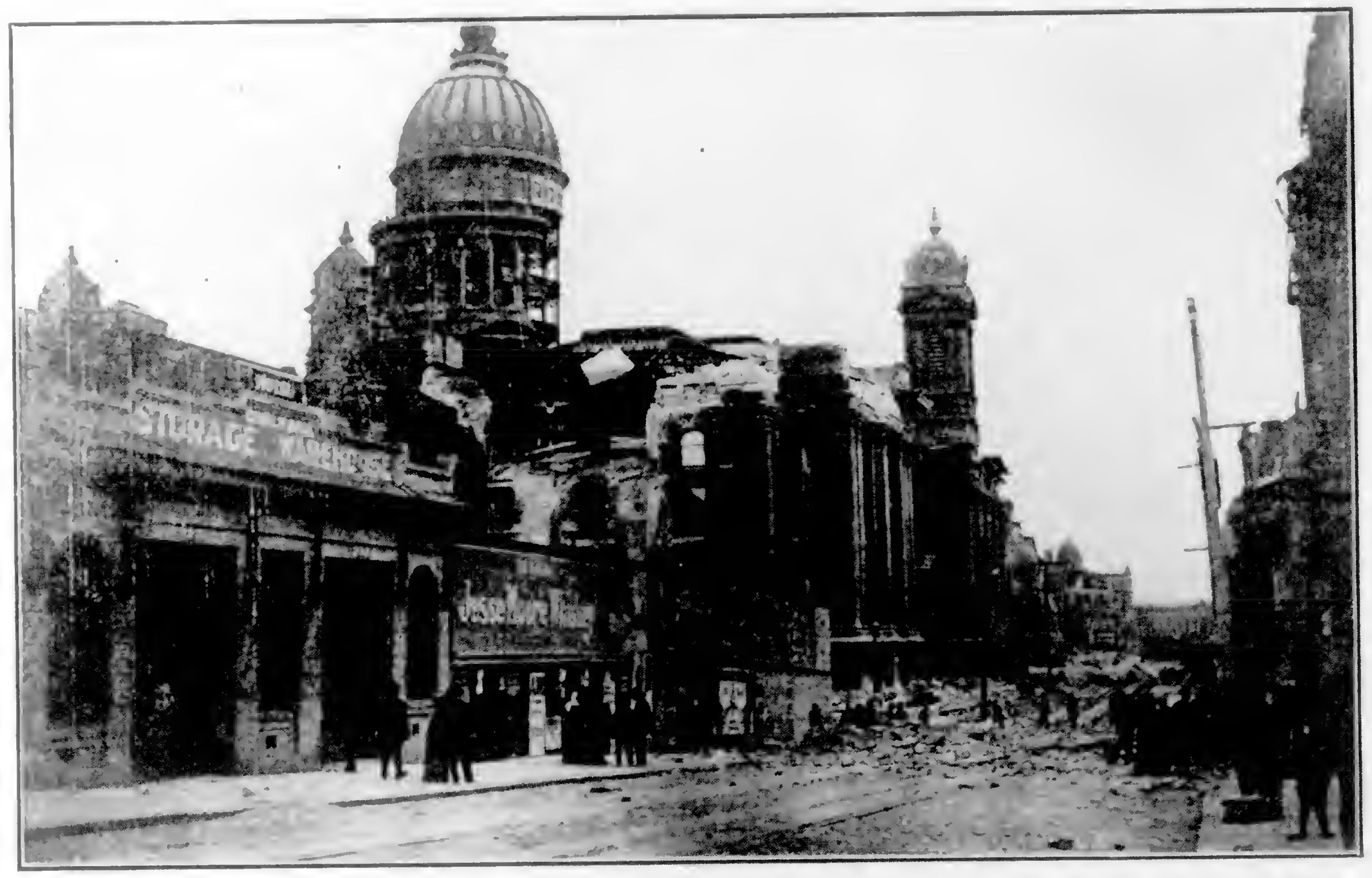
Also, a little further down on Geary street, was standing the sixteen-story skeleton steel-frame of the Whittell building, about fifty feet square, not enclosed in any manner. This frame apparently stood the earthquake and fire with little material injury.

Going out on Market street, we come to the Market Street Bank building, owned, I believe, by the Crocker estate. This building apparently was the least damaged by the fire, of any standing. It is a fire-proof building. The earthquake shook up the brick facing. The banking room on the corner was fit for occupancy, except all glass was broken. This was done, I believe, by the dynamite, or, maybe, the heat from the Odd Fellows' building across the street. The walls of this building were standing, though it was entirely gutted by fire, being wooden-joist construction.

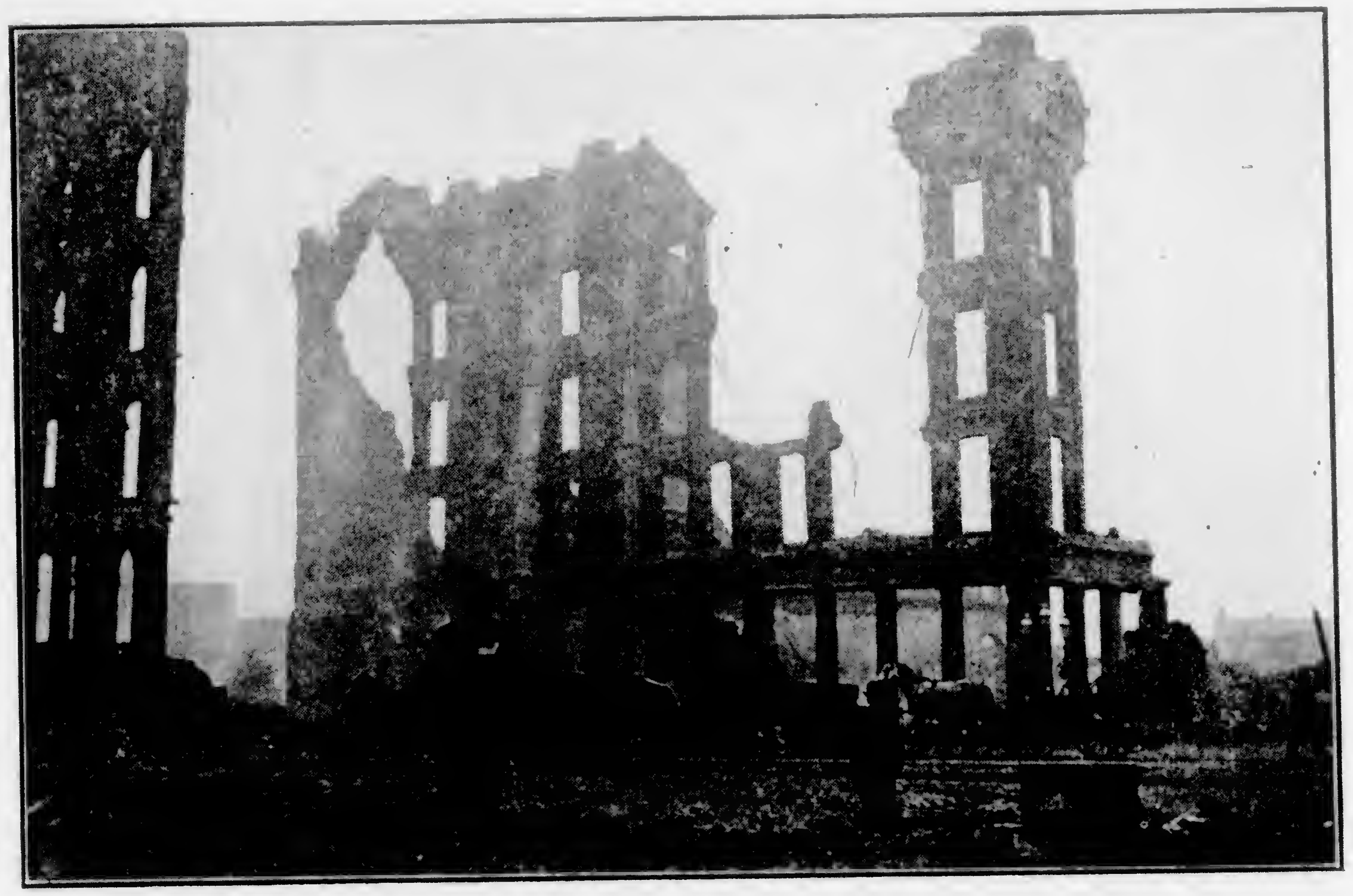
In the rear of the Market Street Bank building is the new Post Office. The ground all around had sunk out of shape, from one to two feet, leaving the sidewalk and everything resting on the ground, in bad shape. The Post Office Building itself is damaged by earthquake, but not very extensively, the granite facing in many places being cracked and spalled; the arch stones being broken as though the rocking motion of the earthquake had caused enormous stresses, and in one place a stone had been squeezed out. On the



Palace Hotel After the Fire. The Best in Brick Construction. Extant in the Early Seventies and Believed Fire-proof From the Lessons Taught by the Chicago Fire.



City Hall Before the Fire. An Example of Poor Construction.



The Baker and Hamilton Building. Typical Example of a Class "B" Building After the Fire.

northwest and southeast corners, there was most evidence of the movement caused by the earthquake. The interior plastering was shaken off and many slabs of marble shaken down. The fire did no damage to this building, except on the north side, toward the buildings fronting on Market street, which were all destroyed by fire; here the windows were broken and wood work blistered. The usual open spaces, solid construction, low stories and small openings of Government buildings, protected the structure.

Going back to the Mint building, I found it little injured by the earthquake, apparently, excepting the smoke-stack was shaken down. The fire had burned the window frames and windows on the north side; otherwise the building appeared to be uninjured. The usual low height and open spaces had been effective in protecting the building.

Going farther west on Mission street, we came to a seven-story building, just about completed, about forty feet in width, for the Coffin Company. This building was apparently uninjured by the earthquake, as far as I could see. The fire had burned out the wooden frames and had spalled the stone work on Mission street front.

Getting back to Market street, we came to the City Hall. This building apparently shows greater effect of the earthquake than any other, the whole upper story being thrown down, and all of the mason work, cast-iron columns, etc., of the tower, up to the springing of the dome, shaken or thrown down.

The Hall of Records was apparently uninjured by the earthquake. Fire swept through this building, eating up what little wood work there was in it, it being a fire-proof structure. A view of this building would create the impression, from its solid construction, that all other buildings in San Francisco must have been shaken down; but only the older and inferior-constructed buildings had been damaged anywise near in the same proportion

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I went across to look at the beautiful one-story Hibernia Bank building. The earthquake had not injured it, but fire had ruined it. Being a granite structure, the stones toward the Grant building had all melted or spalled off. This building was free, a large vacant lot being on the north and west and the two streets on the south and east; but the heat from the six-story Grant building—a wooden-joist structure, cast-iron columns, inferior construction—had caused the destruction of the Hibernia bank. The loss on the bank building is, perhaps, about forty per cent.

Going out Market street to Valencia, to Dolores street, I reached the limit of the fire area. The limit of the fire area appears to have been the limit of brick buildings. Apparently this fire destroyed ninety-nine per cent of all the brick buildings and gutted all of the fire-proof buildings in San Francisco. All that are left are the frame buildings in the residence district, west of Van Ness Avenue, west of Dolores street and south of the line of the Southern Pacific Railway. Everything else to the bay is destroyed, excepting a few frame buildings on the top of Telegraph Hill and Russian Hill.

At the top of Nob Hill, the magnificent Fairmont Hotel, isolated at least three hundred feet from any other building, had all the wood work destroyed by fire. This structure was nearing completion and would have been ready for occupancy this fall. It has a concrete base and steel frame, the concrete extending to the top of the granite, forming backing for the granite. Above this the steel frame is enclosed with brick and faced with terra cotta. The earthquake showed no apparent effect on the concrete base or granite, but above the line of the concrete backing and granite facing on the northwest side, the terra cotta was cracked and shattered, showing the crushing force of the rocking movement of the earthquake.

From this point we could get a clear sweep in every direction, of the fire zone. Desolation in every direction. All I could compare it to is a forest fire, such as I have seen in the mountains of Colorado, the ruins standing up like great, gaunt, skeleton stumps.

Before I finish, I must refer to the four-story building occupied by the California Electric Company, at 642 Folsom street. This building was about 150 feet square, and a brick structure, the interior being of wooden-joist construction. The buildings around it were all destroyed by fire, but the buildings were not very large. There was a vacant street on the south, a single one-story frame building on the east, which was destroyed, on the north an alley, and on the west a private yard about thirty feet in width. This building was little damaged by earthquake, the north fire wall being shaken out.

All windows in this building were provided with galvanized iron frames and sash and wire glass. There were exterior doors in the basement, adjoining the frame building, covered with tin. These doors were charred, but retained their form and strength. The wire glass on the west and north was cracked, but retained its form and protective qualities. This building stood out alone, uninjured by the fire, excepting the cracked glass, and little injured by earthquake. Everything around gone. And standing up was the 10,000-gallon steel tank twenty feet above the roof of the building, supported on T-shaped brick walls. Another evidence that buildings built on

solid foundation were not so much affected by the earthquake. This is rather high ground and not far to bedrock.

I might say that I visited San Jose, taking in all the principal streets. I noticed here that the damage was greatest to the inferior-constructed buildings,—brick, stone and frame. In many instances the buildings were shaken out of plumb, the front shaken out, and fire walls gone. The Court House was greatly damaged, although it held its shape, the walls on the north side being crushed at the first-story level, by the rocking motion. The frame buildings injured, were wrecked by the giving away of the underpinning, whether brick or wood. These were all old buildings, and I think the wood work of the foundations had rotted out and did not have their full strength, so that when the rocking motion came, they simply collapsed.

CEMENT BLOCKS NO GOOD.

I went to Palo Alto, and there it was thoroughly demonstrated that hollow block construction was no good. One two-story and one three-story building of hollow concrete block construction had collapsed. The rocking motion had thrown the walls down right flush with the ground level, not one stone being left above the ground level.

To conclude: I believe that the full steel-frame and the reinforced concrete buildings to be as nearly earthquake-proof as possible. That the more rigid and homogeneous a building can be made, the better it will stand earthquake; that a brick building from being composed of a multiplicity of separate pieces, is not good construction for earthquake, unless thoroughly bonded and tied, and the brick work well laid in cement mortar, and the walls heavy; nor yet stone buildings or veneered buildings. That concrete is fully as good, and, perhaps, better for fire protection than tile. That concrete for filling between beams, especially when used as a monolithic floor, reinforced with steel, is better for earthquake or fire protection than hollow tile filling or flooring, and not only will resist crushing, but distortion, better than tile. That the destruction of San Francisco by fire was primarily caused by the earthquake, which started innumerable fires, which burnt up the inferior-constructed buildings surrounding the well-constructed buildings, setting fire to, and destroying well-constructed buildings and gutting all the fire-proof buildings. That if it were possible to eliminate all the old frame buildings and highly inflammable structures from the congested district of our cities, conflagrations would be hardly possible, as fire starting in a good building would be slow-burning and under control before it could get a start. That every effort should be made to eliminate the frame and inflammable inferior structures as quickly as possible from the congested district, and the only way to do this is, to reduce their earning power. So long as this class of buildings earns a greater percentage on their value than the high-class improvements, so long will they stay. Cut off their earning power and they will go. Prevent any improvements, repairs or alterations to this sort of structure, and their time is limited. The value of wide streets at frequent intervals, to give facility for curbing and fighting fire, was demonstrated by Van Ness Avenue and Market streets. If the fire had not been started on the north of Market street as well as the south, I believe it could have been confined to the south of Market street. But the fire crept up on both sides of Market street, and was not stopped until it reached Van Ness Avenue and Dolores street,—both wide streets.

My observation has shown me that metal frames and sash and wire glass, and wood doors covered with metal, are a reasonable protection against fire. That the steel frame and reinforced concrete only can be called fire-proof construction. That a brick building, to be effective, must have cross walls,—the more the better. See the Palace Hotel. That a good, well-built brick building, even with wooden joists, must not necessarily be shaken down by earthquake or burned by fire.

That even in a conflagration or an earthquake, good workmanship and good construction are great factors in preventing the building from being destroyed.

Buildings erected on alluvial soil, loam, sand or made ground suffered more from earthquake than any other.

* * *

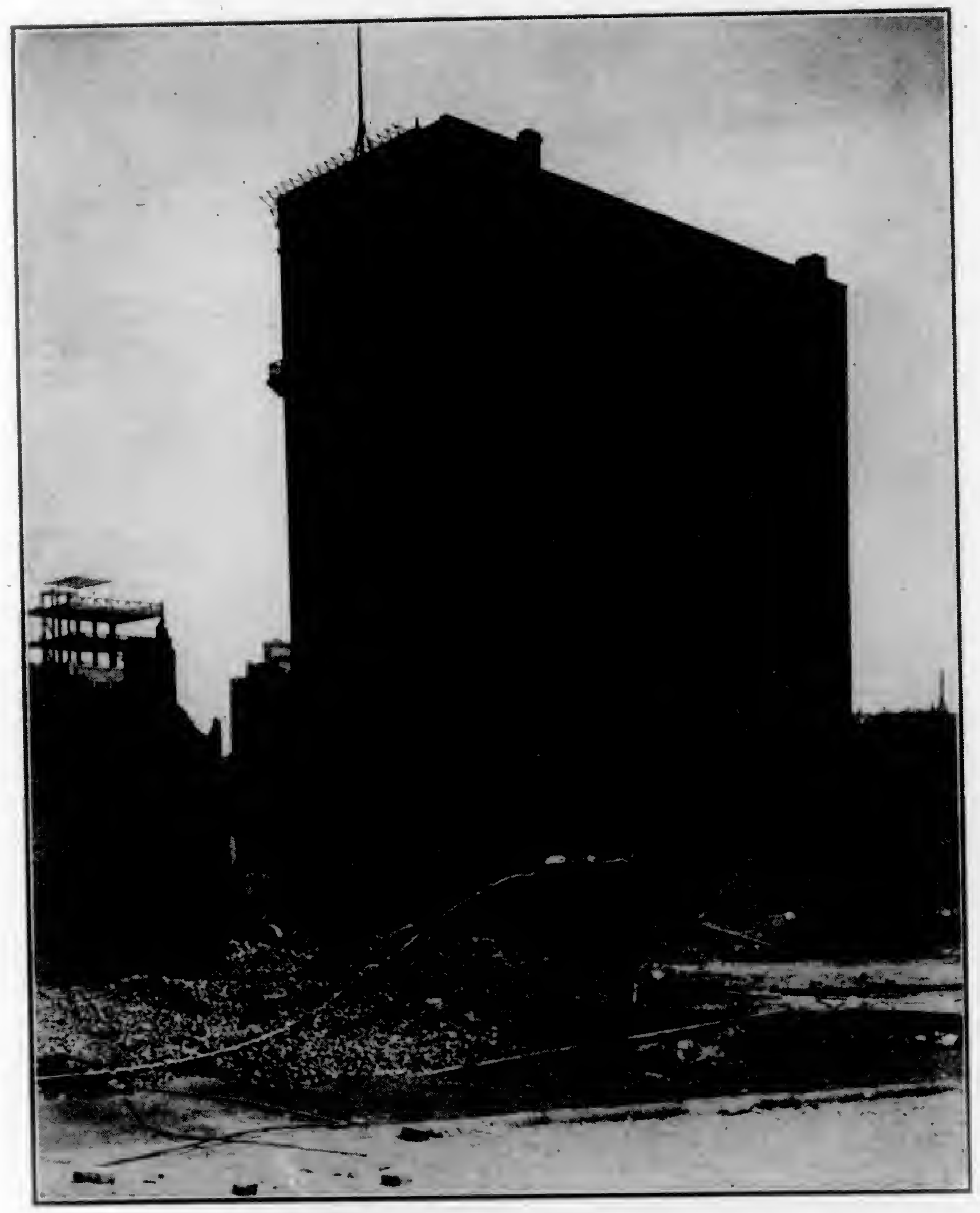


Fig. 1. Pacific States Telephone Building on Bush Street Near Kearny. The Side of the Building is Supported by Reinforced Concrete Cantilever Slabs. A. A. Cantin, Architect

Passing of the Stone Cornice and Finials

By HARRY LARKIN

Member of Technical Society of the Pacific Coast

THE conflagration, long predicted for San Francisco, has come, but not in the manner or in the locality looked for. This wooden city of ours has long been looked upon with wonder by residents of other States and they could see in their minds eye, the resident sections being wiped out by fire, aided by our high winds.

This catastrophe has taught many lessons that architects and builders must bear in mind while re-constructing the city. It is apparent that brick and stone buildings are little more fire-proof than wood construction in a big conflagration, and the comparative amount of damage done by the earthquake was largely in favor of wood construction. The well braced wooden residences, resting on good foundations suffered very little from the tremor.

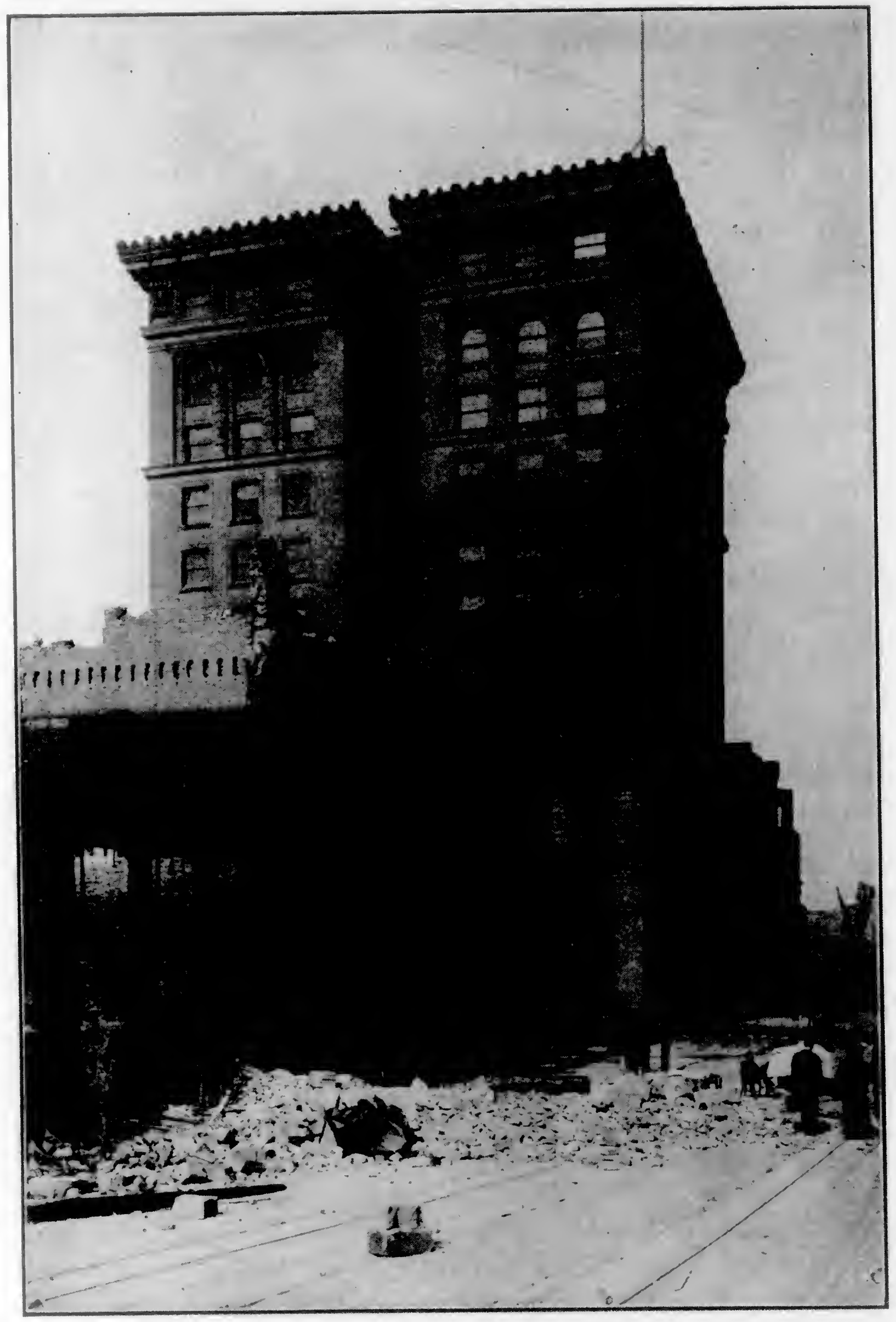
The best built brick and stone buildings all suffered before the fire reached them. As an illustration, a portion of the Crocker Estate building at the south-easterly corner of First and Mission streets, collapsed in the first shake, although it was considered one of the best built, modern, fire-proof constructed buildings in the city. The placing of heavy weights of stone at high points, such as cornices and finials, had done a great amount of damage in falling. At the Stanford Memorial Chapel, more damage was done by these weights crushing their way through roofs, etc., than by the actual racking of the building.

To quote Grover Cleveland: "It is a condition, not a theory that confronts us now." We must put our wooden buildings on good foundations, avoid high basements without cross partitions, and brace the buildings from every point. In brick construction cross walls and anchors must be used and a more perfect bond made with the veneer of stone or face brick.

Now is our opportunity to prove the old adage: "Everything is for the best." The architects, engineers and builders have a clean field. Here is the chance to cover the best suited part of San Francisco with apartment houses and hotels—that district lately occupied by Chinatown and Telegraph Hill. Now is the chance to put all the wholesale houses on the flat ground close to rail and water transportation in the Tar Flat district; the manufacturing establishments in The Dumps, beyond Channel street, at the Potrero and out Division and Harrison streets; and the banks and offices from Montgomery street to the water-front.

Now is the time to carry out Mr. Burnham's ideas for parks and wide boulevards with civic centers. Salt water reservoirs should be placed at all high points, each with its independent pumping station and distributing system for fire protection. Artistic overhead trolley lines should replace the antequated cable roads and a liberal policy adopted by the administration that will encourage capitalists to use their best endeavors to beautify the city while investing their money.

We must all forget our personal prejudices and work as a unite with the object in view of making the New San Francisco the model city of the world for beauty and convenience. The site and surroundings will permit, in fact they cannot be excelled. All that is needed is the spirit. Let us, one and all, put our shoulder to the wheel and in five years San Francisco will be our pride, more than ever it was.



The Kohl or Hayward Building at Montgomery and California Streets. This Building is a Class "A" Fire Proof Structure With Metal Window Casings. The Seven Upper Stories Were Not Damaged in the Least by Fire and the Building Was Uninjured by the Earthquake

How the Earthquake Affected Certain Buildings

By MAURICE COUCHOT, C. E.

ON Wednesday, April 18th, at 5:13 a. m., San Francisco was shaken by a violent earthquake which did considerable damage to some of the buildings. It was the writer's good fortune to be in the city immediately after the shock and to be able to make an inspection of some of the effects of the earthquake on the different classes of buildings.

The Class "A" building, having a steel frame, withstood the temblor very well. This class of buildings, when properly designed for dead, live and wind loads, thoroughly braced and rigidly connected and riveted, with deep girders and gusset plate connections, can be entirely depended upon to resist the action of seismic disturbance, even if such would be of larger intensity than the last one.

The only apparent damage in all the sky scrapers was very slight and consisted mostly of a crushing, splitting or spalling of some of the veneer stone work at the extreme corner piers when the piers rested directly on the foundation. Such was the case in the St. Francis, the Flood building and the Kohl building.

In other cases the damage was in the very well defined characteristic of a cross indicating a swaying or possibly twisting movement inducing diagonal strains in the masonry in some of the piers—the masonry not being able to resist diagonal tension would crack normally to the strains. This is very apparent in the new Chronicle, the Fairmont Hotel and the Monadnock.

The Call, Crocker, Shreve, Union Trust, Merchants Exchange, Mills and Mutual Savings Bank buildings were practically uninjured except for some of the plaster being knocked down, and some of the lintels slightly cracked or the joints had slightly opened.

Even some of the steel frame buildings which the writer knew to be of poor design, where no provision had been made for wind stresses and the connections were of the shelf type, affording the minimum amount of stiffness, these stood the shock very well, the only apparent indications being of larger amounts of plaster destroyed and more stone veneer disjointed. It is remarkable, also, that the stone cornices of belt courses of the above buildings stood so well.

The Class "B" buildings, as built previously, were, and will be (if built again on the same laws), a constant danger. They were nearly all cracked by the shock, not necessarily so as to be torn down, but enough to show that the construction is faulty. The main reasons that I can give are very poor workmanship, the absolute worthlessness of lime mortar and in many a case, faulty designs, lack of proper supervision and enforcement of specifications and city ordinances, and the tendency of slighting work and trying to do work cheap. I may be blunt in my assertions, but I stand for what I saw, and I am speaking the truth.

The frame buildings stood very well, and are absolutely safe below three stories as long as the foundations are properly built. So much for the earthquake.

In regard to the fire, we have passed through the same experience as Baltimore, Boston, Buffalo and Chicago. The same faults have been emphasized, and, while it is a costly lesson, it is the hope of the writer that all that are and will be engaged in the rebuilding of the city will profit by it.

In a conflagration of this magnitude, hardly any building material or combination of materials may be said to be fire-proof. Our big sky-scrapers, our pride, have all been more or less damaged. Wherever the steel frame was strongly designed and properly protected they stood the fire well, but where not protected, they failed—a thing that should never have occurred.

The only protection that can be said to protect steel frame thoroughly is to have it absolutely incased in concrete, having all metal at least 2½ inches imbedded—it will give the steel frame a protection and a rigidity not otherwise obtained.

Concrete has stood best of any material, as was the case in Boston and Baltimore. Common brick has failed more than I ever expected. Terra cotta for floors is a failure. In the partition it has also failed, due a great deal to the lack of stiffness and not being keyed, and to the presence of a number of openings with wooden frames.

The plaster partitions, either hollow or solid, have failed. They would not have failed had slag or cinder concrete been used instead of lime or plaster mortar, which turns to sand when exposed to fire.

The main cause of failure of the metal lath partition is the omission of plaster at the base at the chair rail, at the picture mould and the absurd connection of a steel stud to a wooden slipper or head plate.

Granite, marble and sandstone have all gone to pieces when exposed to heat. Pressed brick has stood best of all. Terra cotta decorations come next, when not too much decorated, hard and well burnt.

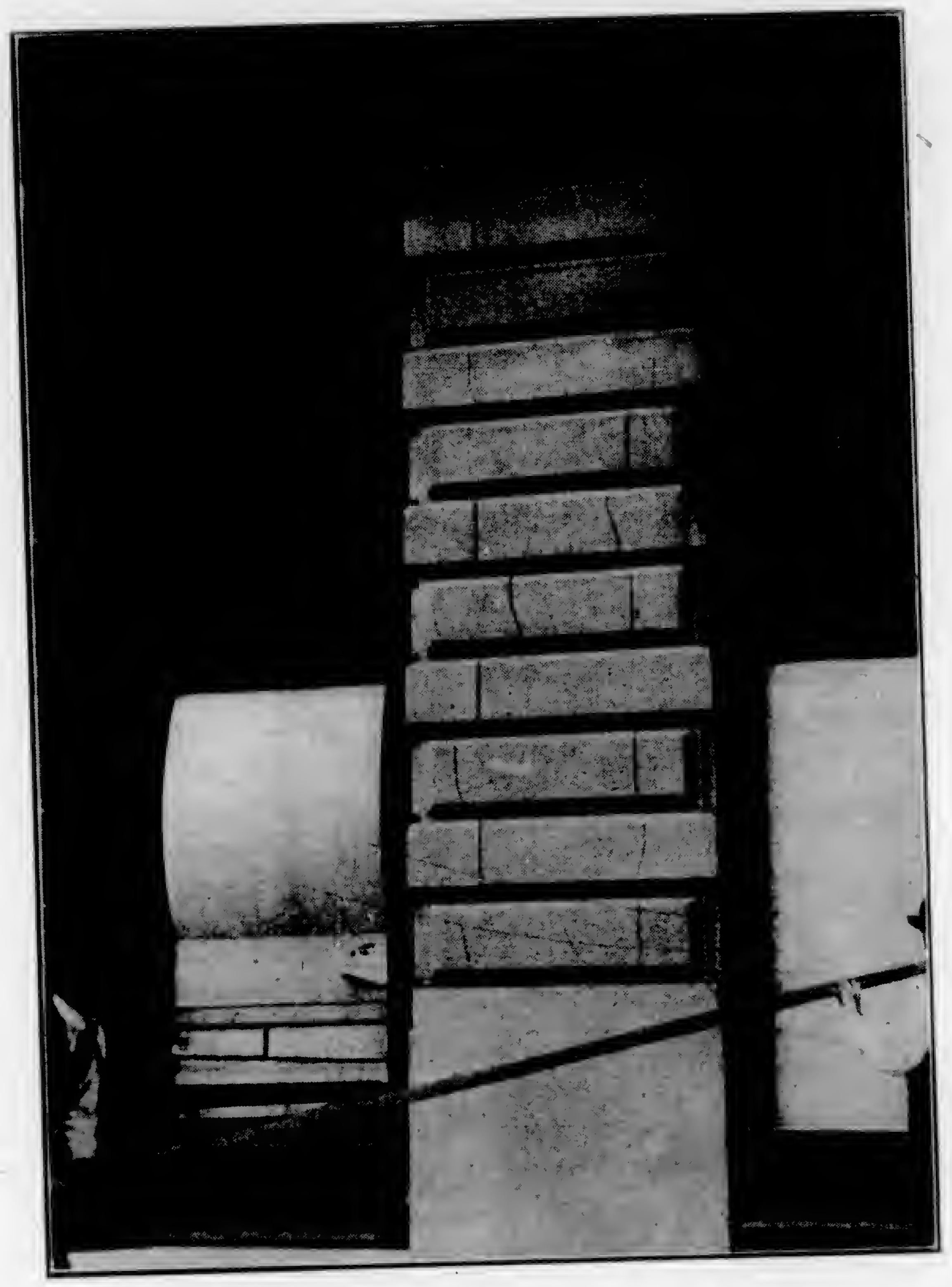
In regard to brick work, brick should be bonded every course. On the line of the Fleming bond with a course of headers and sketchers every course. To lime mortar should be added cement in the proportion of half and half, or even more. Brick should be wetted. This would increase the cost slightly, but I believe it would be a good investment and a very good and cheap insurance. Clipped course for bonding pressed bricks should be entirely condemned, as the result has been seen in one of our biggest buildings. The whole side from the second story to the eleventh was entirely stripped because the 4-inch veneer had only been bonded to the backing by a clipped course every tenth course.

Reinforced concrete had but few examples in the calamity, but as few as they were, they all stood the earthquake and the few that were through the fire came out hardly injured.

The Museum in the Academy of Science on Market street is a good example. This was built nearly twenty years ago by Ransome, as was also the borax works in Alameda. The Bekins Warehouse at West Mission and Thirteenth streets is another example. This building was in course of construction. The brick work is shattered, but the concrete work is intact.

The city ordinances are now in the hands of a very able committee for revision. They ought to be made very liberal, but at the same time very strict, as building laws are not made to tell a good architect or builder what to do, but to prevent a bad design and a poor construction and are to insure safety for the owners.

A Bureau of Inspection, composed of architects, engineers and inspectors, directly under the Board of Public Works, should be empowered to examine all plans submitted and see that the laws are complied with. It may also be said that it is not possible that such another conflagration will again happen as the new condition will be entirely different. We will not see any more some splendid building like the Call, Crocker, Shreve or Mutual Savings Bank entirely surrounded by low buildings of a very inflamable character. Every building rebuilt in the burnt district will be of very substantial construction and will be a protection to one another and prevent any rapid spreading of fire.



How the Earthquake Cracked the Stone Piers in the New James Flood Building
Albert Pissis, Architect

Structural Lessons of the Earthquake Disturbance

By CHARLES DERLETH, Jr.,

Associate Professor of Structural Engineering, University of California.

NEARLY five weeks have elapsed since the fatal earthquake day, and everybody has been busy helping on the one hand to bring order out of chaos, and studying on the other to learn the lessons to be taught by the earthquake and fire destruction.

Different people have different points of view. Therefore our great calamity teaches different lessons to different classes of students. The California Earthquake Investigating Commission is studying purely the earthquake problem and is devoting itself to the purely scientific phenomena. The astronomers and physicists are studying the nature of the earth's crust in this vicinity. They are investigating the structural problems of the earth's crust with the weapons of the geologist. On the other hand the engineers are attacking the question in its relation more directly to man and to human works. They are studying the earthquake resistance of buildings of different types of construction; they are investigating the effects of the temblor on water works and sewers and streets, on bridges and machinery.

Neither purely scientific nor the entirely technical investigations are sufficient within themselves alone. To obtain the best results, the various investigators, from their different points of view, must co-operate for mutual benefit and clearer understanding. No one individual or body of individuals can handle the whole problem. Much time will elapse before all the data can be collected, and more time still will be consumed in digesting the results and formulating conclusions.

Geologists and physicists are anxious to learn the seat of the disturbance and the nature of the ruptures in the crust of the earth. They are desirous of studying the laws of transmission of earthquake waves and the effect of different strata and varying topography upon the intensities and directions of shock. This earthquake is not of the volcanic type, but belongs rather to those phenomena which associate themselves with mountain making forces. The coast ranges are young and are growing, and the Pacific Coast for that reason is from time to time more or less subject to crustal stress. When this stress in any locality exceeds the strength of the rocks some type of slipping or movement must take place. The earthquake of April 18th appears to be the result of a very complex system of crust movements and the physicists are anxious to attack a problem which it is presumed will add much to our present knowledge of seismology.

Manufacturers, contractors and engineers in their field are anxious to learn of the destructive tendencies of earthquakes and how different structures, different material and different grades of workmanship have behaved. Since this earthquake was followed by a great conflagration in San Francisco, they are further anxious to study the fire-resisting qualities of different types of structures and of the component substances of which they are made.

Less than five weeks, as I said in the beginning, have elapsed since the beginning of this active investigation and the time really is not ripe to state final conclusions, and yet hypotheses and conclusions are to some extent at this early date necessary in order that they may bring out discussion and criticism. On the purely theoretical side the geologist must advance his working hypotheses regarding the nature of the cracks, the positions of the lines of weakness, and the probable conditions of rupture and motion. On the other hand the representatives of the technical professions must advance conclusions regarding the behavior of structures and materials. They may not all be right, but they will bring forth argument.

The writer has examined the earthquake destruction in Berkeley and Oakland, and has visited the property of the Spring Valley Water Company. He has also spent much time in San Francisco examining the earthquake damage and fire ruins. Confining himself to the lessons to be learned in San Francisco and vicinity regarding the course which should be pursued in the immediate future to insure in the new San Francisco greater structural stability against earthquake vibration and more certain resistance to fire, the following conclusions are advanced. They are not to be understood as final, but as mere tentative statements advanced as opinions which the writer is ready to change or modify as discussion and criticism reveal more complete facts and develop early observational errors.

1. The cornices on the top walls of ordinary brick and stone structures should not be heavy nor have great projection. The earthquake has generally demolished them. A considerable number of lives have been lost by falling brick and stone from these sources. In the future cornices and top walls should be more securely anchored with metal, their masonry bond should be made with care, and cementing materials should be of the highest quality.

2. Terra cotta and similar materials should not be so profusely and boldly used in the future. They are not good structural materials. They have been badly cracked by earthquake vibration. The north wall of the Fairmont Hotel, where it is composed of terra cotta, has been miserably cracked. Pressed brick work with good mortar and a proper bond is a far stronger material.

3. Wooden buildings and cheap brick structures should be discouraged in the business section of the city.

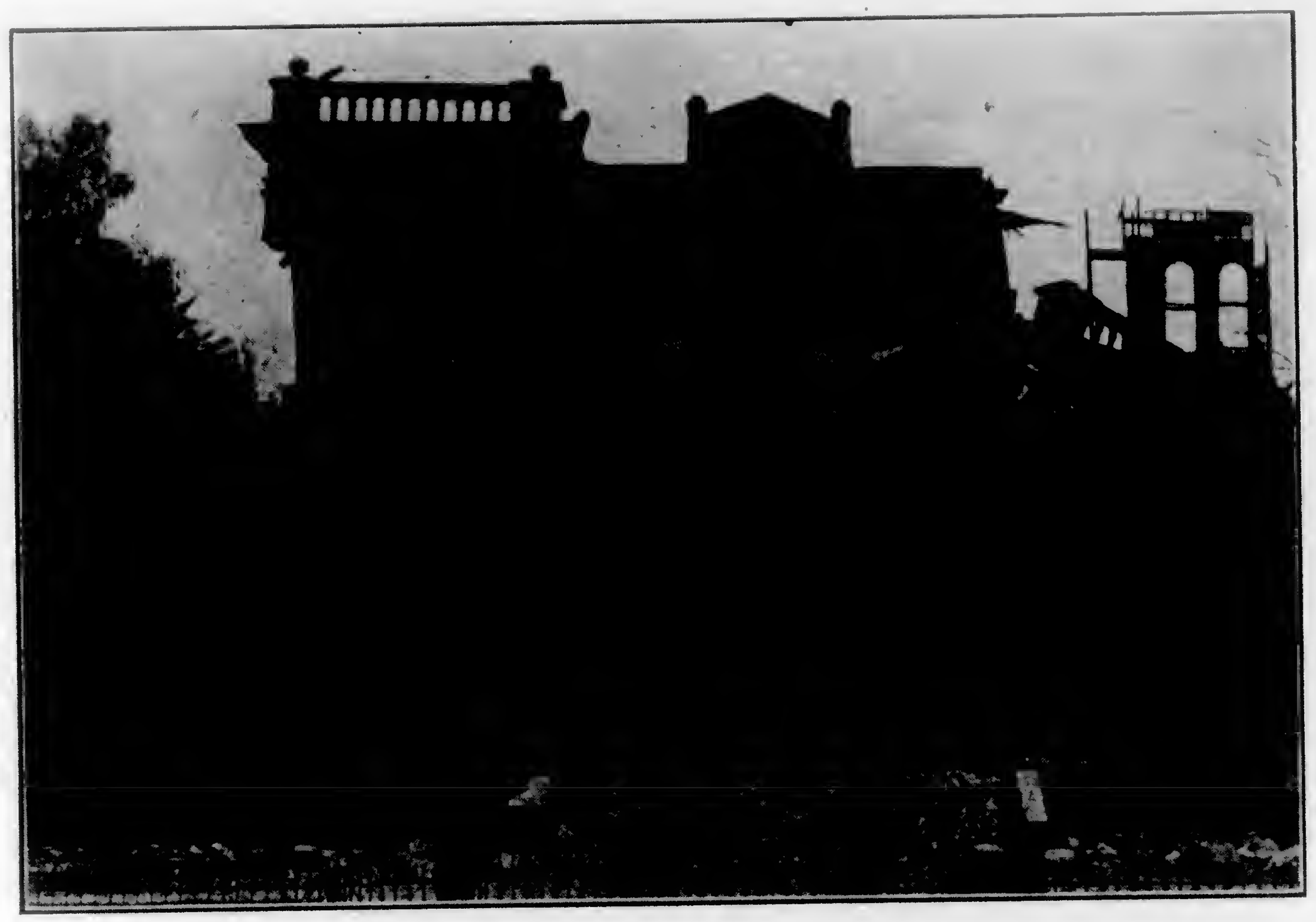
4. Frame structures upon soft ground should have carefully framed foundations to act as units to distribute the load as a whole; such buildings should have carefully constructed framing to prevent their collapse.

5. Brick buildings when without steel work and of light construction should have small height, three to four stories at the most. The bond of the brickwork should be carefully inspected and floors securely tied. On soft ground their foundations should be even more carefully designed for stiffness of framing and distributing power than those for wooden buildings. Roof trusses of wood should be properly framed, and have lower chord tension members, especially when the trusses rest on brick walls. Faulty trusses have generally thrust out the brick work due to the sinking and spreading of the roof frames. The High School building in Berkeley is a typical example. Roof trusses of steel for school buildings ought to be used and not wooden trusses. The Majestic Theatre in San Francisco clearly shows how such trusses have kept high brick walls from collapsing.

6. Cheap lime mortar should be allowed in the future for no buildings. Cement, with just enough lime to make it workable, should be more generally insisted upon. The High School building at Berkeley again may be taken as an example of a lime mortar building, although the writer regrets to state that he could name hundreds of buildings. In the light of what has happened it should be a crime to use bad bond and lime mortar for brick work in school and public buildings, in fact in all buildings. Mortar has been too generally applied to dry brick. The First National Bank of Berkeley may be referred to with pleasure as an example of the use of cement mortar. Let contractors examine that building. Let them remember, too, that it was severely criticised because of its heavy steel framing. I do not believe the owners of the building now regret the expenditure of extra money for cement mortar or for a few pounds of steel. Let the builders of the City Hall in San Francisco examine the excellent brick work with cement mortar in the pumping stations and gate houses of the Spring Valley Water Company. I must especially note the brick work of the waste way gate house at San Andreas dam and the brick tunnel leading away from it which were practically on the line of fault. Brick in cement mortar with good bond stand surprisingly well.

7. Brick buildings of greater height than four stories should have heavy walls and a proper number of interior crosswalls to give lateral stiffness. The Appraiser's building, or Custom House, was unharmed by the earthquake; the Palace Hotel stood the shock splendidly, the latter being an excellent type of brick structure whose brick walls were thoroughly reinforced with iron rods.

8. At the time of the earthquake there were entirely too many top-heavy and improperly braced brick and stone towers and steeples in San Francisco. I believe where they are merely ornamental, they should be discouraged as far as possible. Their ruins are everywhere to be seen in San Francisco. The Ferry tower might have had heavier diagonal framing.



High School Building at San Jose After the Earthquake, April 18, 1906

Jacob Lenzen, Architect

Post Office at San Jose, After the Earthquake. Original Height 120 Feet; 45 Feet Broken Off

John Knox Taylor, Government Architect

Most towers lack in interior cross walls and in the necessary steel frames. I believe that reinforced concrete where not too boldly employed, could be well adapted for these purposes.

9. Important buildings like the Postoffice should not be placed on filled or treacherous ground.

10. High buildings on soft ground with pile foundations of the proper design have withstood the earthquake shock well. Considering the nature of the material on which the Ferry building rests, it stood the shock extremely well, because of its excellent pile foundation. The Call building foundation represents another type apparently equally well fitted for service with its particular conditions of foundation material.

11. Reinforced concrete should be more respected in the future by the building laws and trades unions of San Francisco. There is no reason why buildings of this type, designed by competent engineers, should not be six to eight stories in height.

12. Low buildings of this type of construction would seem to the writer far better able to resist earthquake shocks than brick, stone and frame buildings.

13. On soft ground footings for ordinary buildings, too light to require pile foundations, might have footings, foundation walls and cellar slabs of reinforced concrete to act as units and give distributing power.

14. Reinforced concrete sewers should be studied in the light of the brick sewer destruction which has been so generally meted out in the made ground of the city.

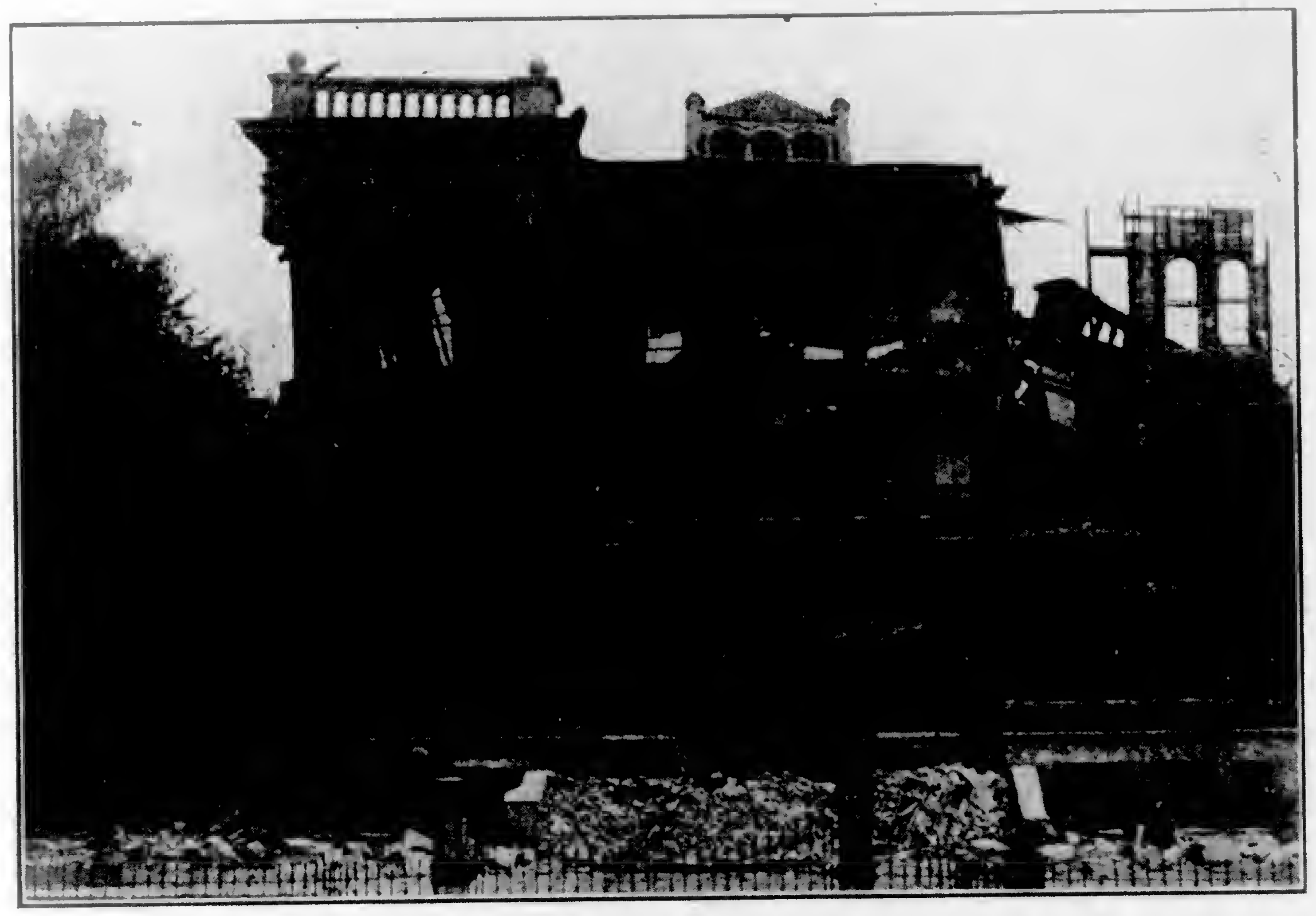
15. Important water mains should avoid soft ground and when they must necessarily pass from firmer to softer ground, they should be provided with flexible joints and cut-offs.

16. Important water mains upon which the fire service depends and which must run through the made ground, should be riveted wrought iron or steel, have flexible joints at intervals, and be lodged in tunnels, say of reinforced concrete. Earthquake disturbances like that which produced a billow like surface near the water front might severely crack such tunnels without great injury to the pipes, due to the properties of the metal, the nature of the joints, and the clear space between the tunnel walls and the pipe. Such a construction would further give more probability of access to the pipe in case of a calamity.

17. Important net-works of pipe in the gridiron system might be arranged in more or less independent units, arranged with respect to the soft and the firmer grounds of the city, so that pipes in made ground could be quickly separated from those on a more solid foundation. The main conduits running from the storage reservoirs to the city should avoid marsh land as far as possible, but where they must necessarily cross swamps and marshes, they should be provided with flexible joints and not be too firmly blocked to their platforms.

18. Brick chimneys should be built with cement mortar and not be too high. In many cases a forced draft had better be considered. A study of reinforced chimneys should be made; I believe they would withstand shocks much better than brick ones.

19. In the business section of the city, Class "A" buildings should be encouraged at the expense of Class "B" structures. Skimping of steel frames should meet with entire disapproval. Diagonal framing should be introduced wherever windows and interior corridors do not prevent. Heavy knee brace framing or portal framing should receive more attention.



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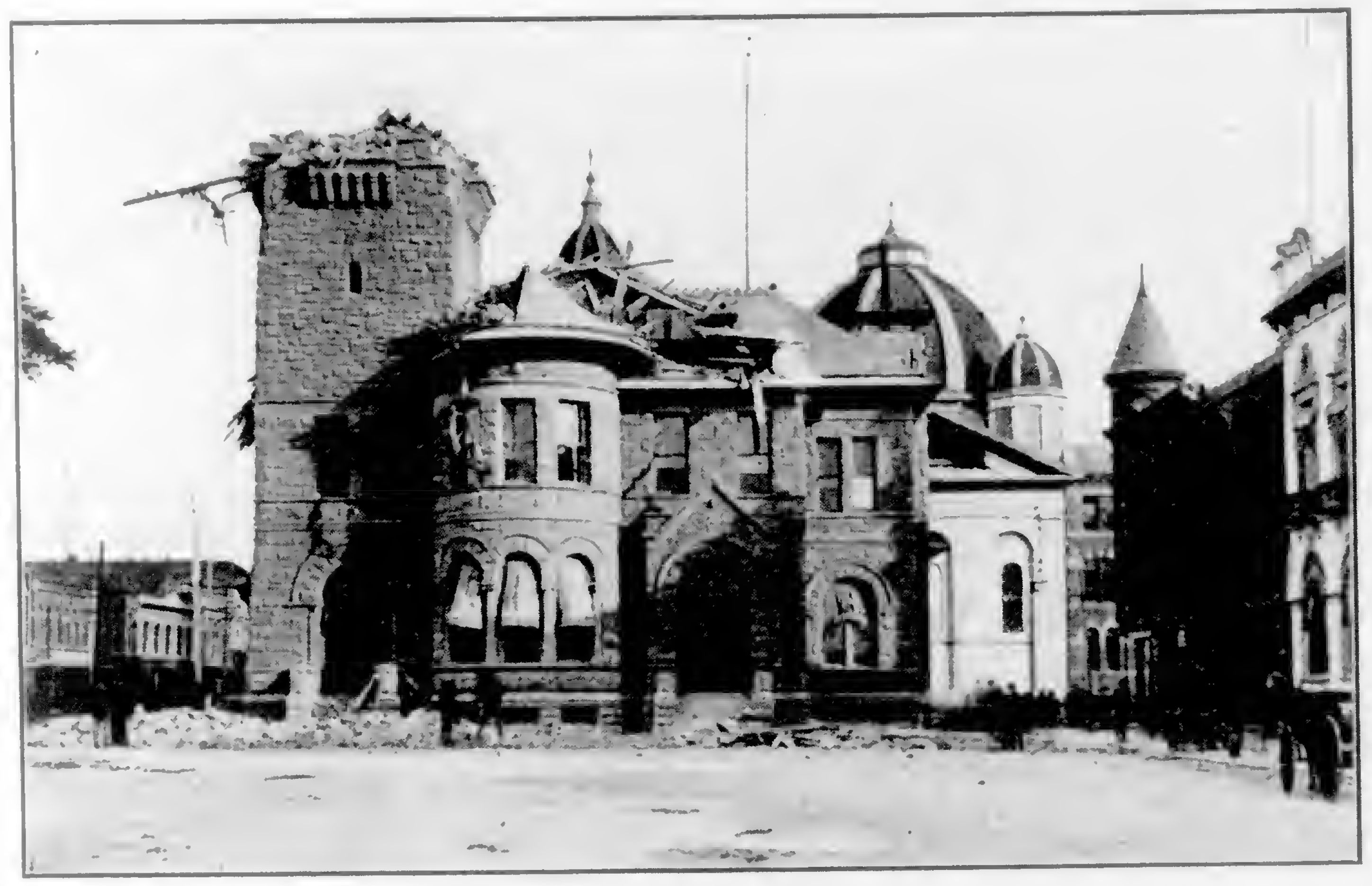

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20. Steel columns should run through more than one floor and column joints should be so distributed as to bring a minimum number at any one floor level.

21. Cast iron columns should not be used.

22. Heavy stone ornamentation should not be hung to the steel frames and heavy centralized supports on the first floor should be avoided when possible. I believe that the Flood building is open to criticism in these respects. Except on suitable firm ground buildings over twelve stories in height would seem unwise. No expense should be spared for foundations of buildings of a greater height.

23. Face brick should be carefully bonded to the back brick in Class "A" buildings. Large areas of face brick fell, for example, from the west wall of the Merchants Exchange building because of improper bond.

24. Reinforced concrete buildings of careful, honest and intelligent design should be allowed to enter competition in San Francisco. See Note 11.

25. Building laws of San Francisco should be reconstructed in the light of the Baltimore fire, our earthquake and our conflagration.

26. Granite and sandstone have been badly chipped and spalled by the fire. Terra cotta has not stood the heat well. I have no respect for this latter material either structurally or as a fire resisting medium. Concrete has stood the heat splendidly. Brick walls with lime mortar have thoroughly disintegrated by fire. What the earthquake began the fire finished. I cannot condemn the lime mortar too strongly. It has no place in engineering work and architects should learn to listen to good advice.

27. Belgian block pavements have spalled miserably.

28. Hollow tile partitions in the General Postoffice have been greatly destroyed by the earthquake. In other buildings, notably the Mills building, hollow tile partitions and floors have shown great weakness to fire from a structural standpoint, though the individual blocks may have been able to stand the heat. From what I have seen I am decidedly not an advocate of hollow tile construction either from the fire or the earthquake standpoint See also Notes 2 and 26.

29. Almost invariably floors and partitions of reinforced concrete have withstood the temblor magnificently and have shown up excellently in the fire test. By the fire most all other types of floors have been thoroughly disintegrated. Everywhere in the city may be seen buildings standing, whose partitions and floors, where intact, prove to be of concrete and reinforced work.

30. Our so-called fire-proof buildings have not been protected by proper window construction. The wooden window frames have quickly ignited from surrounding fires, the ordinary glass panes have been quickly cracked, giving quick access of fire to the interior, thus allowing the tall fire-proof structures to act like chimneys under forced draft, because of the elevator shafts; and where the floors and partitions have been of sound materials like concrete, the contents of the rooms and offices have been roasted as though they were in ovens or furnaces.

31. No structure is fire-proof against a great conflagration. The so-called fire-proof structures can only be said to retard the progress of fire, and this they cannot do without improved window design.

32. Metal window frames, metal shutters, Venetian blinds, wire ribbed glass windows and other devices of this kind should be more fashionable in San Francisco in the future.

33. Important buildings should have roof tanks or cellar tanks or both for water storage, with pumps.

34. Artesian wells should be encouraged.

35. High buildings like the Mills building, in which the floors are supported on steel frames, but whose outer walls are self-supporting, should not be imitated in design in the future. When such a building is badly shaken or when it has its outer walls locally damaged, repair is difficult. In Class "A" buildings where the steel frame carries the wall of each floor independently, such difficulty vanishes.

36. San Francisco should have more wide streets like Van Ness avenue.

37 The business district should be safeguarded by a salt water system in addition to the regular water supply for fire service; and where salt water pipes must run through made ground, they should be provided with flexible joints and with a tunnel construction as above suggested for main water pipes; or they should be on the surface.

38. San Francisco needs a better fire boat service.

39. The small distributing reservoirs within the city limits should be connected with the main conduits by suitably large pipes independent of the regular gridiron system. They should be carefully designed and be easy of access. Some of the necessary delay in forcing water through crippled street mains to the various city reservoirs and pumping stations might, with the above provisions, have been avoided.

40. Class "B" buildings ought not to exist in the main business and banking districts of the city, and certainly no wooden or easily inflammable structures should surround expensive fire-proof buildings. In our present calamity wooden buildings have acted like kindling wood.

41. Interior floors of mosaic or tile with metal covered woodwork add to a building's safety against fire. The Kohl Building had such an interior.

42. The effect of heat and cold upon steel frames of high buildings in the regions of fiercest fire should be studied in connection with the types and thickness of fire-proofing.

43. Electrical insulation for high tension transmission should be rigorously inspected.

44. Inspection of all classes of construction should receive greater encouragement in the future. Dishonest work and incompetent design should be advertised. San Francisco has paid dearly because she allowed bad construction.

In the above tabulation the writer has not intended to criticise any particular building or advocate any special type of construction. The ideas are frankly advanced impersonally and without prejudice, as the first impressions of a two-weeks examination of the ruins. Only continued study and conference with others can result in safe and reliable conclusions.

* * *

Admitted to Practice

At a recent examination of the California State Board of Architecture, the following were granted certificates to practice: W. J. Saunders, 333 Mason building, Los Angeles; G. A. Goersch, 537 East Thirty-sixth street, Los Angeles; E. J. Burke, Hellman building, Los Angeles, and G. E. Bergstrom.

Residence of William B. Gester at Berkeley. This House Is Built of Reinforced Concrete and "Roman Stone" and Was Uninjured by the Earthquake
Jas A. Leonard, Architect

Reinforced Concrete in the Earthquake

By WM. B. GESTER, C. E.

THE architects and engineers of the world are gathering with the most intense interest notes of every fact and every experience possible in connection with the late disastrous combination of earthquake and conflagration in and about San Francisco.

There will be very many records of happenings noted by dwellers in structures of wood and brick and stone, and in those of steel frames, and the lessons derived therefrom should be numerous and valuable.

Inasmuch as my own experience of the temblor was had within the walls of a reinforced concrete building, it may be of interest to many to have a record of the sensations felt, and the effect of the shaking upon the structure.

An illustration of the building accompanies this article. It is a "story and a half" dwelling located in the eastern portion of Berkeley, a few blocks south from the University of California.

The seismic disturbance in this district was probably just about as violent as it was in the University grounds, where accurate measurements were automatically recorded. The vertical height of the earth wave is said to have been one inch. The intervals of the waves were about one second, and the disastrous portion of the disturbance lasted about one minute and a half. So this particular piece of the earth's crust was lifted and dropped vertically, a distance of one inch, about a hundred times.

To the uninitiated this may not carry an idea of much impressiveness, but to all to whom it was an experience, it was one of awe, compelling a peculiar profound consciousness of infinite human insignificance and helplessness. In the house in question, those of us who could hold ourselves to side or head or foot of our beds did so. But one of the occupants, an active, athletic young fellow weighing about 170 pounds, was thrown by the shock from his bed to the floor. Scrambling to his feet to reach the door of his room, he was immediately landed upon his hands and knees, and thence flung in a huddled heap into the angle formed by floor and wall. Pictures, furniture, the chain-hung electroliers, everything not fastened to floor or wall, was put into instantaneous motion, the commotion and the din being indescribable.

The building itself, however, came through the racking with so little damage that it serves as an example of the value of a simple type of ferro-concrete construction.

The foundation walls, having a base 20 inches thick, are constructed of well-tamped 1-2-5 concrete made with domestic Portland cement.

The walls above the foundation, to the line of the first floor joists, are 12 inches thick, and above this line they are but 8 inches thick. Of this thickness, 2½ inches is a veneer of blocks of cast concrete known as "Roman Stone," or Stevens Cast Stone, thoroughly anchored by corrugated galvanized iron ties to the main body of the wall. This "Roman Stone" is made of poured concrete, a 1 to 4 mixture of Pacific Portland cement and finely crushed rock from the California City quarries in Marin County.

The main wall is a well-rammed 1-2-5 concrete, reinforced with vertical one-quarter inch iron rods, spaced 16 inches apart, and tied horizontally with heavy baling wire. The outer walls and the arches of the vestibule are of solid blocks of "Roman Stone."

Except for the arched vestibule, the structure is a monolith, and the effect of the temblor is such as might have been expected. The whole building rose and fell as a single mass, without creak or groan or complaining strain, but with a very solid impact it came down after every lift, chunk-chunk-chunk, as if it had been a great cast iron box.

The following damage was suffered: One chimney, not the large one seen in the illustration, but a lighter one in the rear of the building, was twisted just above the roof line, so as to require rebuilding. Inasmuch, however, as this chimney was not braced above the roof, and differed but little in construction from thousands of others that suffered similarly, no particular deduction can be drawn.

The pointing of the keystones only, in all the arches of the vestibule, was cracked so as to require repointing. Not a single other joint in the building was disturbed or injured in the least, and not a stone was broken or cracked.

The joints of the keystones that were loosened were so affected because of lack of weight above the arches, there being but one course of stone between the top of the arches and the comparatively light portico roof.

The principal deduction to be drawn, therefore, from this particular experience is that reinforced concrete wall construction, in its simplest form, if only well done, is proof against a more than ordinary severe earth crust disturbance, and that with proper anchorage and honest mortar joints, a stone veneer will be held to it in absolutely perfect condition.

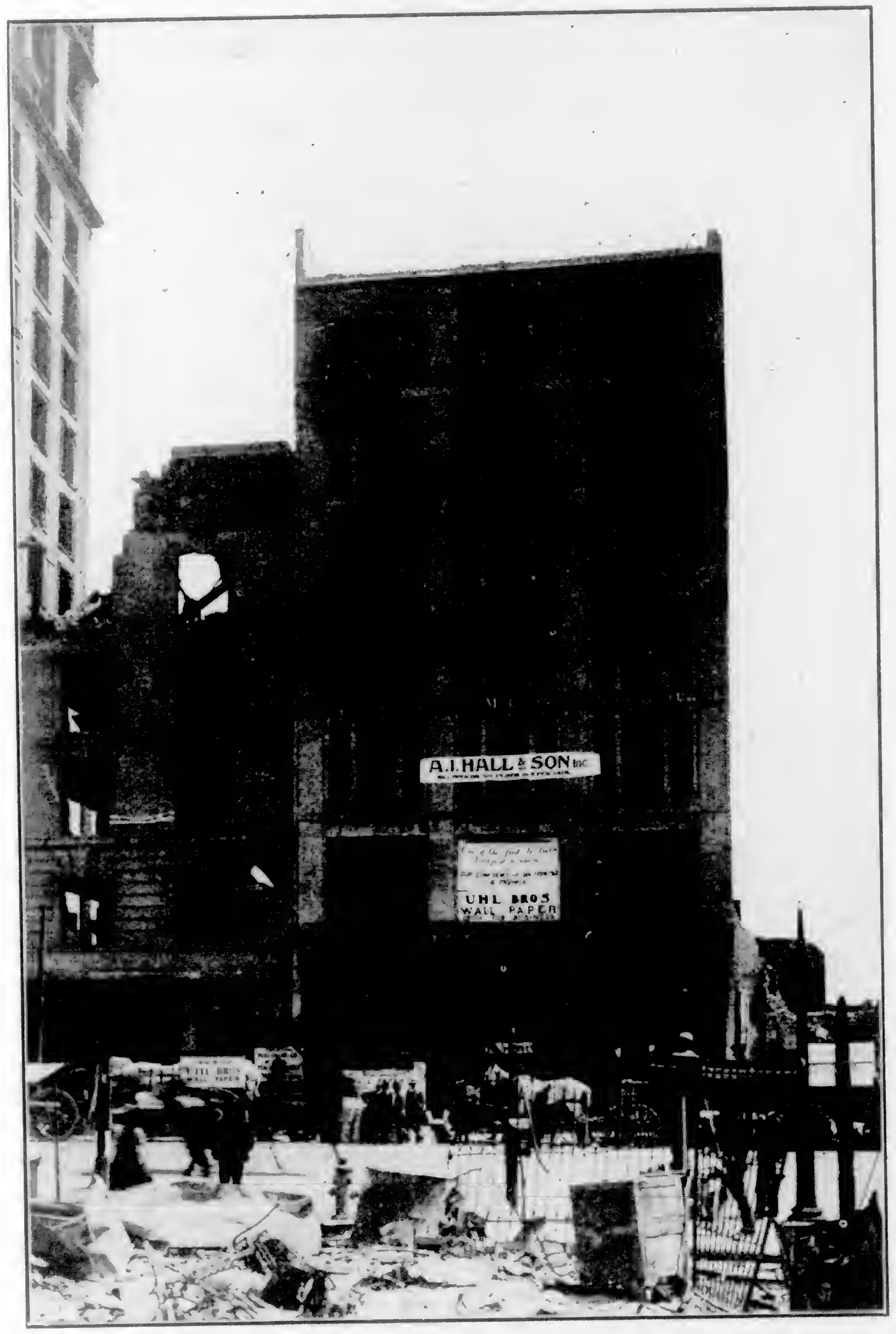


Fig. 3. The Kann Building Having Reinforced Concrete Floors. This was the First Building on Market Street to Be Re-occupied After the Fire

Bliss & Faville, Architects

How Reinforced Concrete Stood Earthquake and Fire

By JOHN B. LEONARD, C. E.

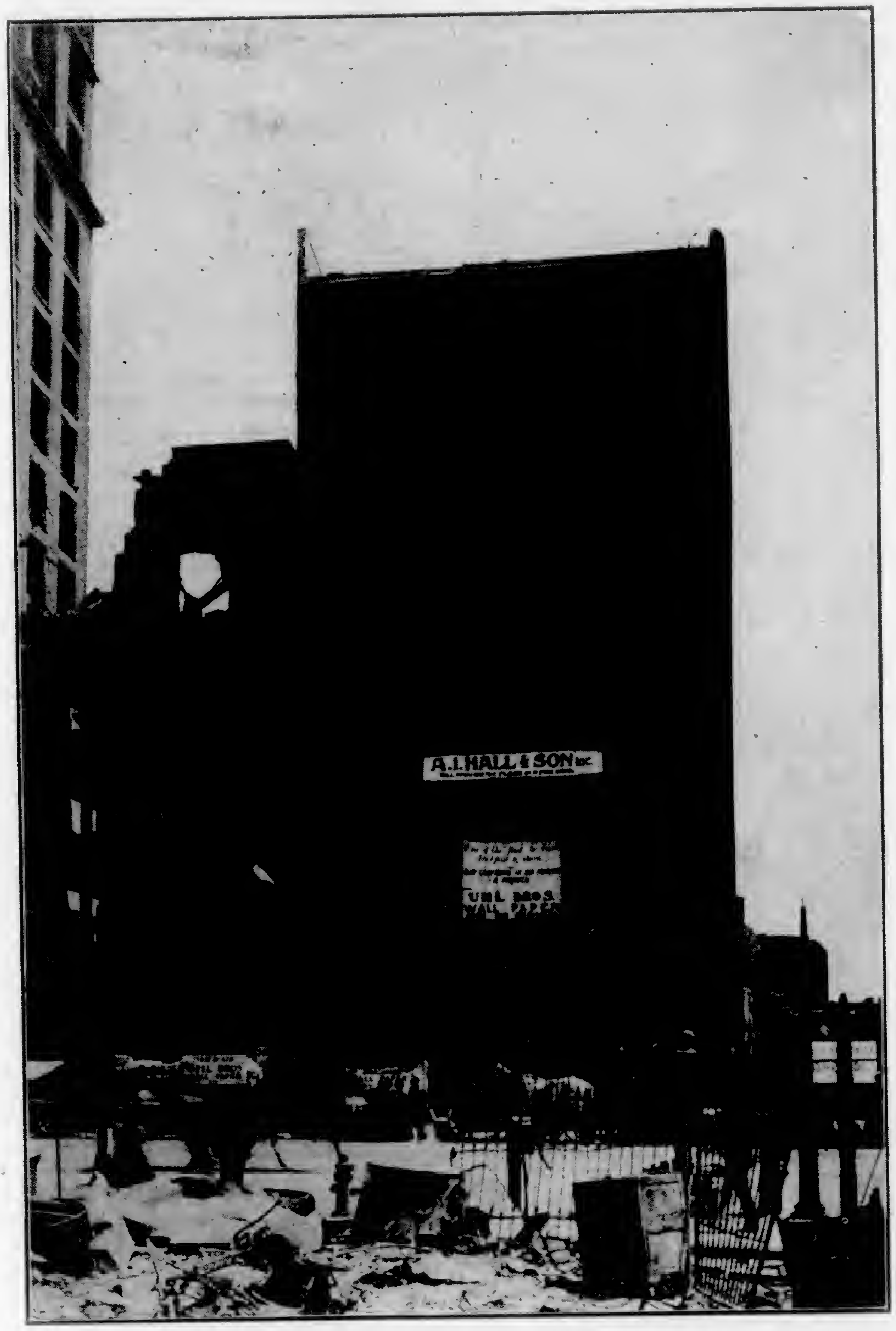
THE great earthquake which occurred in San Francisco on the morning of the 18th of April, followed by three days of conflagration, was probably the most severe test that modern building construction has encountered. A great many conclusions, some of them diametric, will be drawn by those who have been privileged to study the ruins of this city. For the benefit of those who have been unable to make a personal study of the situation and who are particularly interested in reinforced concrete, the writer submits the following views together with such data as he has been able to collect.

Owing to the antagonistic building ordinance, there did not exist in San Francisco an all reinforced concrete type of building of sufficient magnitude to make our data complete. With but one exception, this construction existed in the burned district only in the form of floor construction and fireproofing. In other sections near the city there were small structures built entirely of reinforced concrete. These received the full force of the earthquake and show no damage therefrom. They seem to have ridden the waves of vibrations, as one occupant describes it, as though they were so many cast-iron boxes rising and falling enbloc, with an entire absence of the rumbling and grinding noise which was prevalent in all other classes of construction. Two notable instances of this construction being the residences of Wm. B. Gester of Berkeley and Henry Gervais of San Mateo.

The Marsdon building, situated on Kearney street, between Sutter and Bush streets was in process of construction. It consists of steel columns and steel girders, the floor slabs and intermediate beams being of reinforced concrete. The columns were fireproofed by being incased in concrete. This building did not suffer at all from the fire test but had a very severe test from the earthquake owing to its unbraced condition. The floors show no cracks and the concrete on the columns appears sound; the exterior brick walls are badly damaged.—Messrs. Meyer & O'Brien, Architects.

Figure 1 represents the Pacific States Telephone and Telegraph Company's building, situated on Bush street near Kearney. The building is constructed of steel columns and beams with reinforced slabs. The condition of the floor slabs is reported to be good. The foundation on the side of the building shown in the view consists of reinforced concrete cantilever slabs and shows no settlement whatever.—A. Cantin, Architect.

Figure 2 shows the Young building, at the corner of Stewart and Market streets. This building was within one block of the water-front and everything surrounding it was destroyed by fire as were also its contents. The floors were constructed of reinforced concrete of the old suspension type in which the strap was exposed on the underside of the beam. Their general appearance indicates that they have gone through terrific heat without appreciable injury. The building is on pile foundation, as it is situated in the portion of the city that is constructed on filled ground. The portion of the street on the corner, it will be seen, has settled on this account about 2 minutes. The columns were protected with Expanded Metal Lath and plaster and seem to be in very fair condition.—Herman Barth, Architect.



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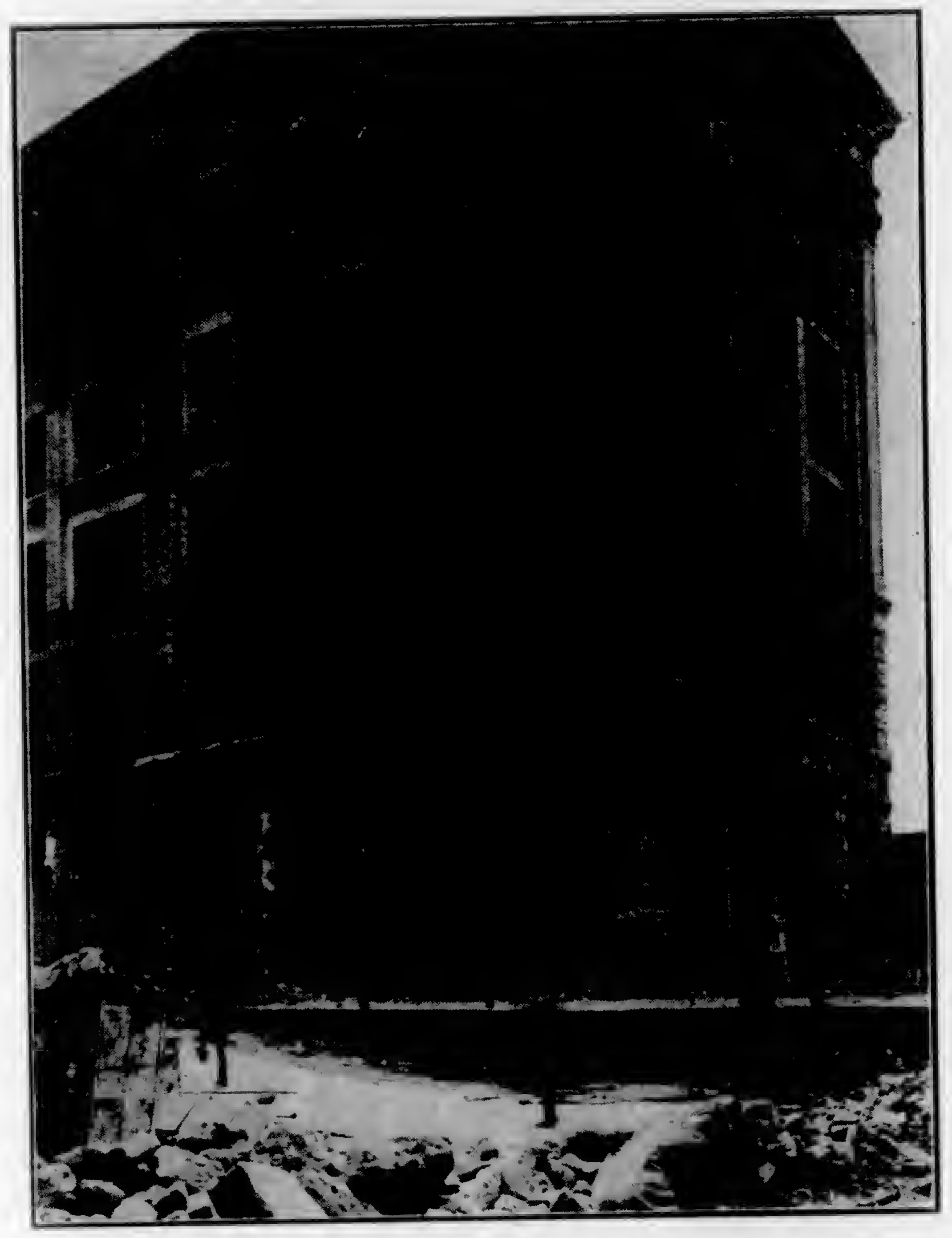


Fig. 2. The Young Building, Corner of Steuart and Market Streets, Showing Admirable Condition of Concrete Floors Which Were Constructed Under the Suspension System Herman Barth, Architect

The Aronson building, situated at the corner of Third and Mission streets, is constructed of steel columns, girders and beams with reinforced concrete floor slabs. The columns were fire-proofed with tile. The floors are all in position and have a good appearance. The fireproofing of the columns is in a lamentable condition. In the basement, there were two columns that were fire-proofed with concrete which are intact, while two columns, closely adjoining, fire-fire-proofed with tile, have buckled down nearly, if not quite, one foot, from the heat. The present condition of these columns indicates that a large portion of their estimated load must have been relieved by the arching action of the floors above.—Hemmingway & Miller, Architects.

The Rialto building at the corner of New Montgomery and Mission streets, consists of steel columns and girders with reinforced concrete floors. The two corners suffered from an explosion in the interior of the building, the character of which is unknown. The balance of the floor work seems to be in excellent condition. The foundation of the building was also of reinforced concrete.—Meyer & O'Brien, Architects.

Figure 3 is a view of the Kann building, situated on the south side building did great damage to the rear portion. The portion extending back from Market street to a depth of about 70 degrees is excellent condition. The construction consisted of steel columns, girders and beams with reinforced concrete slabs. It was subjected to

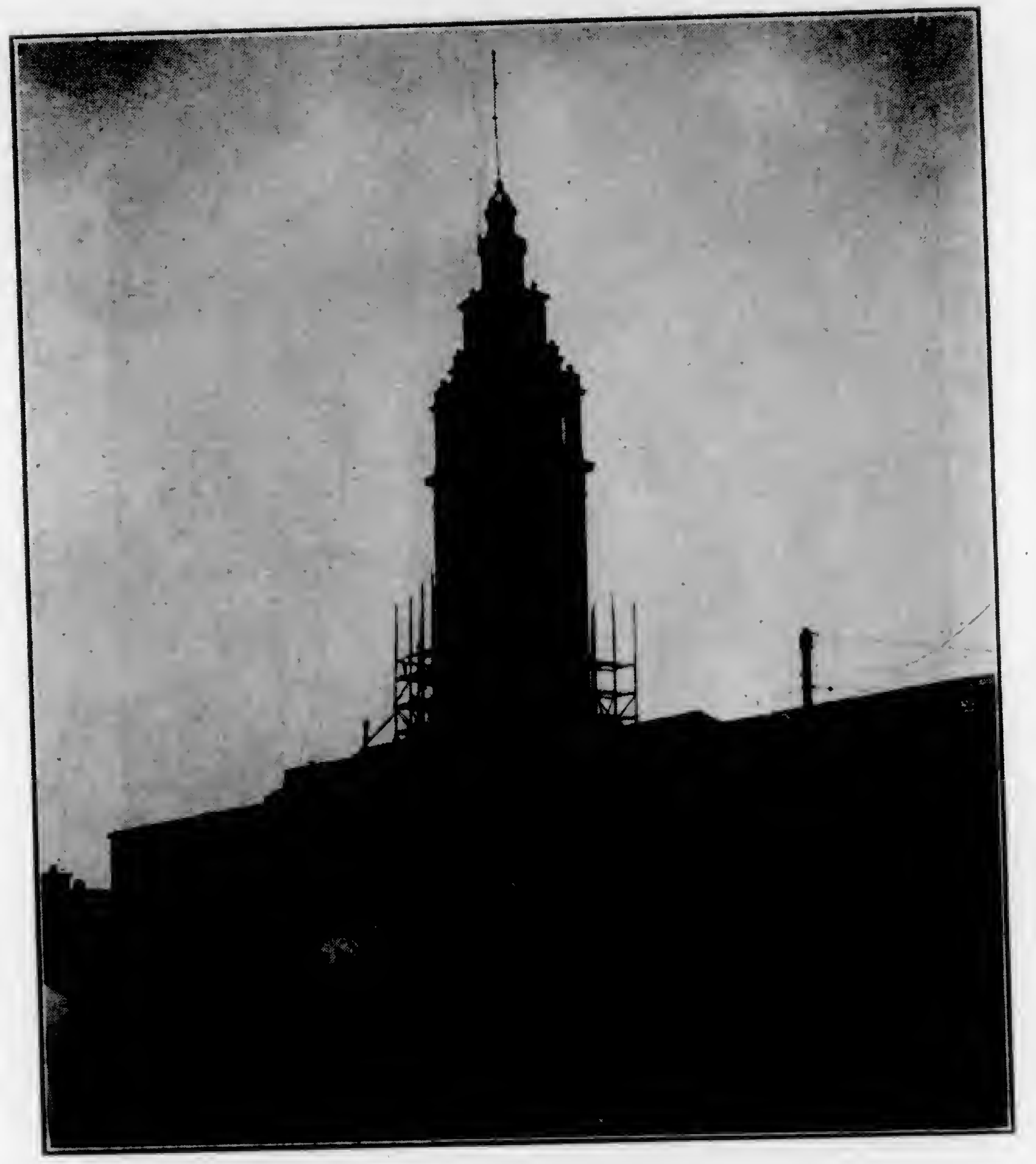


Fig. 8. Ferry Building, the Tower of Which Was Badly Strained by the Temblor and Is Now Being Reconstructed of Reinforced Concrete by the Pacific Construction Company

a very severe fire test, but enjoys the distinction of being the first mercantile building on Market street to be reoccupied since the conflagration.—Bliss & Faville, Architects.

Figures 4 and 5 show the effect of blasting on the Casa Calwa Wine Company's building, on Townsend street, near Third. The buildings to the east and north of this were burned to the ground. Part of the damage done to the Casa Calwa building was caused by the dynamiting of the adjoining buildings in an endeavor to stop the fire and shows the behavior of the reinforced concrete floors when their span was unexpectedly changed from 20 to 40 minutes by the destruction of part of the wall. The intermediate spporting beam having lost its wall support at the outer end dropped from beneath the slab, even tearing out some of the reinforcing rods attached to the intermediate beam. The floor shows a remarkably small deflection under existing circumstances. The slab on the second floor shows sufficient strength to support not only its 40-foot length but the intermediate beam as well as even when the wall support for this beam was destroyed. The construction of this building consists of steel columns and girders with reinforced concrete intermediate beams and slabs. No other portion of the building has suffered any damage whatever and is now being filled with a stock of wine. The foundations were also of reinforced concrete.—Messrs. Meyer & O'Brien, Architects.

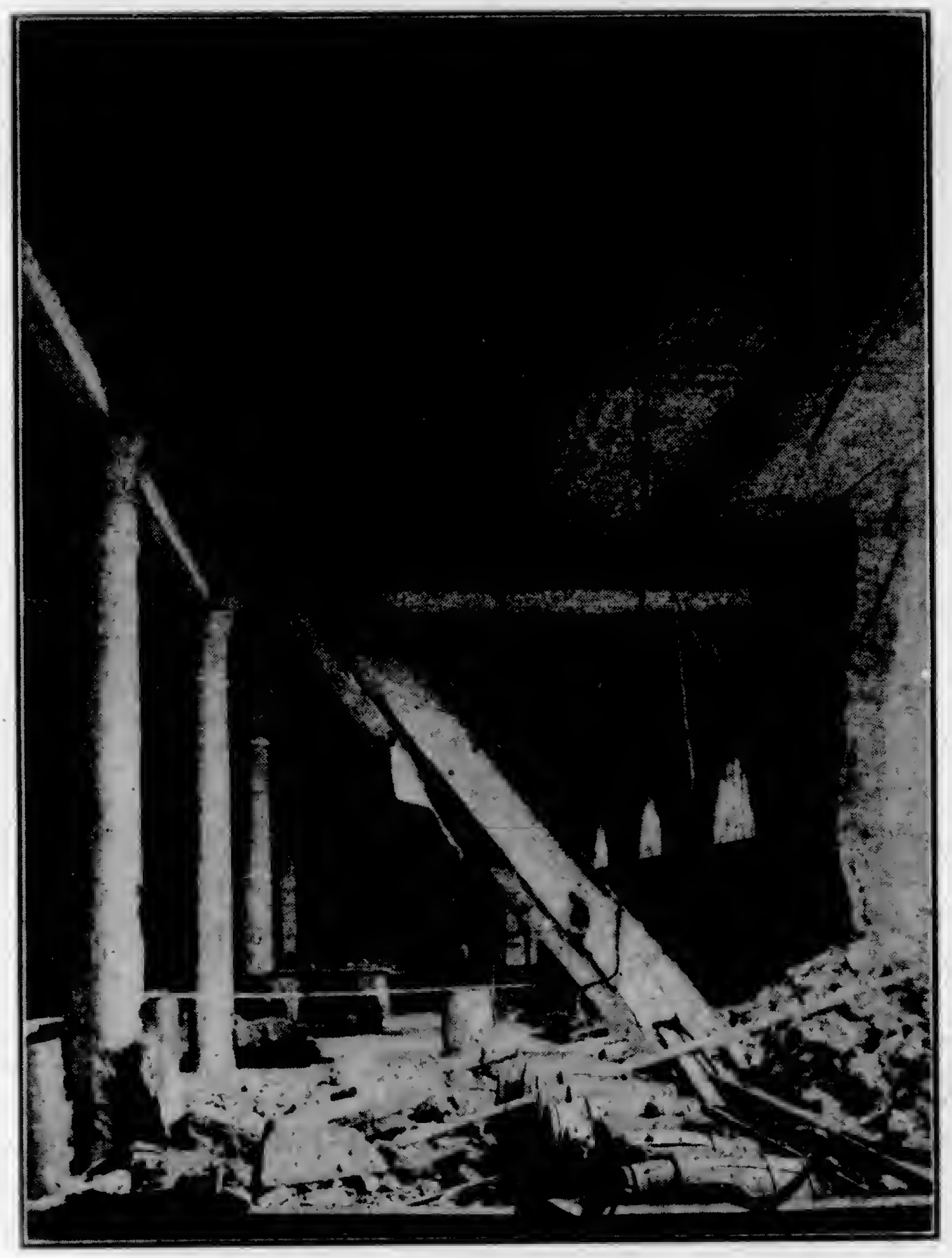


Fig. 5. Interior View of the First Floor of the Casa Calwa Building
Meyer & O'Brien, Architects

Figures 6 and 7 are exterior and interior views of the Bekin Van and Storage Company's building on West Mission street, near Thirteenth. This building is constructed of reinforced concrete columns, girders, beams and slabs with exterior brick supporting walls. It was under construction at the time of the earthquake, there being but three of the six proposed floors completed. The concrete for the basement floor and columns was completed on February 1st, the second story columns and second floor March 25th, the third floor columns and third floor April 12th. A careful examination of the concrete portion of the building fails to reveal any sign of injury or cracks as a result of the earthquake, while the exterior (brick) walls have suffered severely. One bay at the front of the building was filled with highly inflammable goods which were destroyed by the fire. The effect of the fire on the underside of the second floor was to pit the concrete only sufficiently to expose a small portion of the rods in a few places, but did not seem to effect the strength of the floor. This concrete was less than one month old. The owner of the building intends, if the new city ordinance will permit, to replace the brick interior walls with reinforced concrete. The conservatism of the previous building ordinances compelled him, much against his wishes, to build originally with brick exterior walls.—Ralph Warner Hart, Architect.

Figure 8 is a view of the Ferry building, at the foot of Market street. The construction of this building consists of steel columns, girders

and intermediate beams with reinforced concrete slabs. The entire building rests upon pile foundation; the tower consists of steel columns, beams and bracing with brick curtain walls faced with stone. The tower having been so badly damaged by the earthquake its immediate reconstruction was imperative; the State Board of Harbor Commissioners have already awarded the contract to the Pacific Construction Company for its reconstruction in reinforced concrete. All the reinforced concrete floors in this building were found to be in perfect condition and the only necessity for even partially restricting the traffic in the building was caused by the failure in the tower.

There are many other buildings constructed with reinforced concrete floors supported on steel girders, some with steel beams and others with reinforced concrete intermediate beams which are typically represented by the views shown in this number.

The reinforced concrete bridge at Pollasky, consisting of ten 75-foot spans, together with wings, a total length of 780 feet, shows no defect whatever from the earthquake.

The 112-foot concrete arch, designed by the writer, which was built across Dry Creek in Stanislaus county, near the city of Modesto, also passed through the temblor without showing the slightest sign of crack or failure.

At the present time, so far as the writer is informed, there has been no tests made on any of the ruins, but preparations are now being made to enter into this field of investigation. When this has been completed very definite information will be obtainable as to the amount of damage, if any, suffered by the reinforced concrete construction.

An inquiry among architects and engineers, together with my own observations, have failed to reveal any instance of failure on the part of reinforced concrete. Its general behavior has been such as to make it the most favorably considered material for the rebuilding of San Francisco by the investing public. This uniform expression of confidence by the laymen becomes the more noticeable because of their expressed convictions of the insecurity and danger of brick structures, based upon their observation during the destruction of a city.

Of the damage occurring by the earthquake in San Francisco, over 90 per cent of it was visited on the brick construction. The tall steel frame buildings of the Class "A" type have inspired a great deal of confidence through their behavior. However, before a positive statement can be made regarding their condition, a careful examination and survey will have to be made of their connections. The writer is aware of several instances where the rivets have been sheared off entirely, and for that reason feels very confident that the condition of these buildings cannot be accurately stated until at least the principal connections have been stripped and thoroughly examined. The adaption of a method for future connections in "Class A" buildings to be built in San Francisco will be greatly influenced, if not wholly controlled, by the conditions found to exist in the present buildings.

◆ ◆ ◆

Bjenks: "They say it isn't easy to keep a girl in your kitchen nowadays, but I've had the same cook twenty years."

Bjones: "That is a great record. How did you manage it?"

Bjenks: "I married her."

◆ ◆ ◆

Friends: "Hello, old man! how are you? I hear you've written the very latest novel of the day."

Author: "Well, I had at twelve o'clock; but it's three o'clock now."

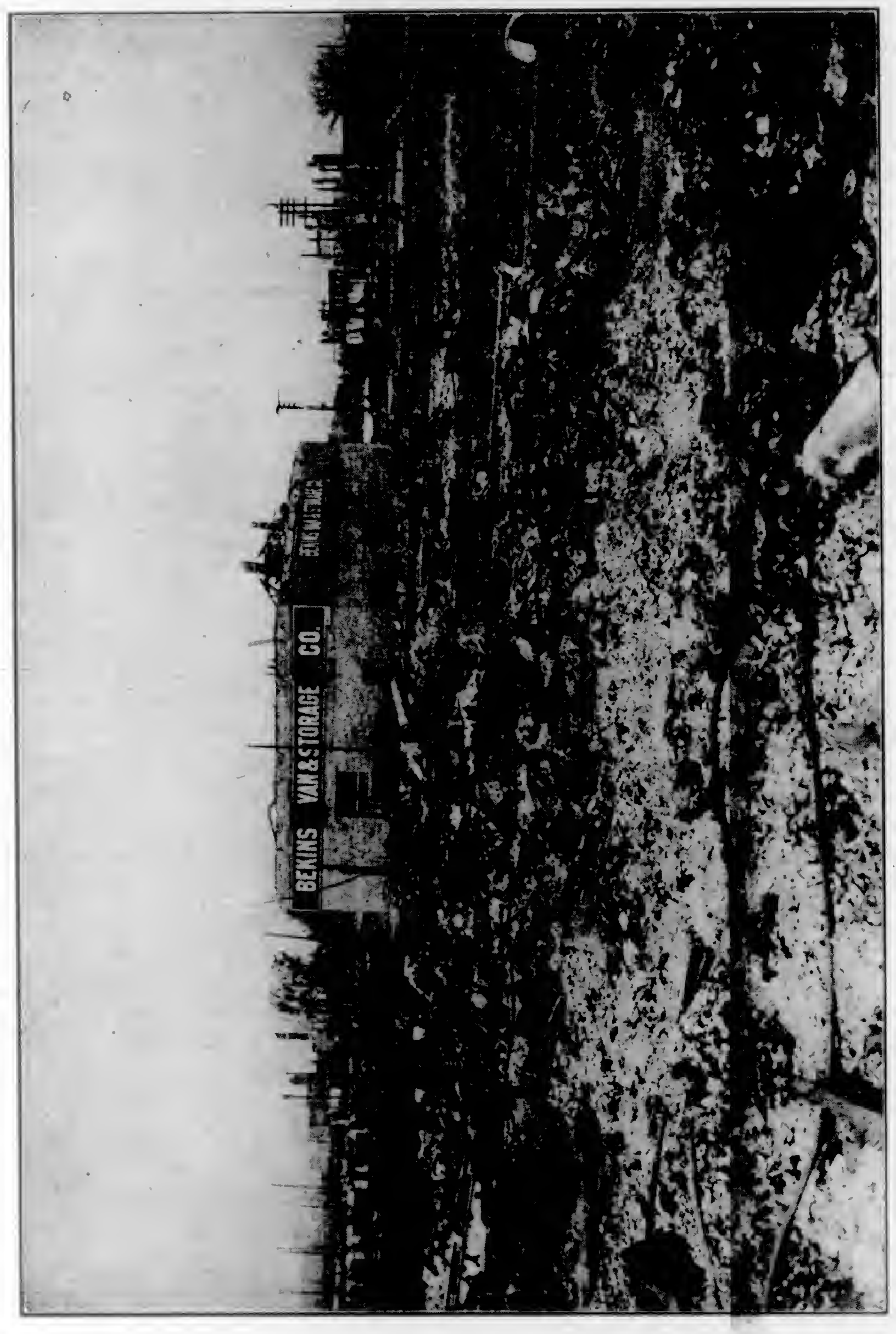


Fig. 1. General View of the Bekin Van and Storage Building. Having Brick Exterior Walls and Interior Construction Entirely of Reinforced Concrete. The Only Damage to This Building Was to the Brick Exterior Walls. Ralph Warner Hart, Architect

San Francisco and Baltimore on Fire

By A. DODGE COPLIN, Architect

OUT from the dome of the sky and over the domes of stately buildings from the Potomac to the Golden Gate rings out the alarm of fire. Comparative data, if you please, twixt the smoke and curl of heat that rose from one Atlantic sister city and the breathless force of devasting heat crouching for staggering leaps through the raking sky line of the Western Metropolis. Great as our Sequoia Giants are to the fern leaves of Eastern villages, so equally colossal in magnitude is the recent disaster standing out against Baltimore and other known calamities of like character. Extreme as must be the comparison between the two once glorious municipal specimens of our Commonwealth as to size of evident disaster, still in each case the triumphal entry of the sturdy and indomitable Yankee is ready to meet the breach, plug the leaks, hoist the sail, and flags, and slam out the news to creation's hosts that the work of restoration shall go on. And how shall it go on? Here we collide with a vital point.

The writer was in Baltimore a year and a half ago to inspect the ruins and commencement of rebuilding, and also again this winter to note the progress of new work and rehabilitation. Most vividly portrayed for those who learn through observation's realm, is the lesson gleaned from the Eastern method. Baltimore in need made haste. Yes, and in the hustling, headlong rush for new structures came what already portends to flatten itself out over San Francisco.

Like a shot from a gun and with the cry "On to Baltimore," came masses of cheap, half burnt brick, masses of cheap unskilled artisans, and into walls that should have reared themselves to endure were heaped the twist of clay called brick, with enough sand and water to resemble mortar. And today it all stands, or rather is held up by adjoining buildings to attest to the inadvisability of the excess of so good a thing as "hustle." Let San Francisco crowd forward with her beacon lights fusing above the harbor fog line, but when she begins to lay the stones for time again, see to it that the long view of the future is engrossed on her banners.

Let the coming generation, some of whom were recently born in the throes of the quake and fire, live to grow and learn that the present second edition of the '49 spirit has built a vast city of steel and reinforced concrete upon the golden laden rocks of California hills. May they also know that our architects and scientific men have lived to learn and from a ten years' study here presented in a day, have been able to formulate deductions coupled with past experiences that go to make up the city invincible.

As to the technical and practical problems involved in the new district pensation of Greater San Francisco, it is quite unnecessary to look for any sensation in new innovations of a structural character. The lesson written on the lining of the smoke rift clouds is to do all things well. The present status of our best steel fire-proof buildings are a logical conclusion of the inventive and scientific mind of man. And if they are erected at their best the final analysis shows that they are for the normal needs of the affairs of man quite up to the mark.

While it is possible that reinforced concrete will cut a heavy factor hereafter in quake and fire-proof buildings, still there is nothing to bar the wise use of other lines of our best stones and pressed brick and terra cotta work.

As a sum-bonum let us select the best—do the best and begin to rear and build for enduring time.

Send up the skyscraper on San Francisco's undulated dunes, and underneath the top soil gridiron the sub-soil with interwoven steel and concrete until this cradle of steel rocks serene, our superstructures through the oft repeated quakes of mother earth.

As to the anatomy and material entering first class work let the experience now on tap for the architect cause him to enter the building arena like horse and rider going into battle—one and the same. May the steel be braced, tied, anchored, wound and bound as never before. Then with the outer architectural cloak and the inner utilitarian features all latticed and amply tied into one common whole, we will have monuments fit to perpetuate the destiny and names of men upon whom a great duty now devolves.

Forty Men to Plan New City

UNDER authorization of a resolution adopted by the general relief committee, Mayor Schmitz announced the appointment of a committee of forty which is empowered to take charge of the work of framing suggestions for the guidance of the Supervisors in the widening of streets, correction of grades and other public improvements, as well as all other matters affecting the rebuilding of San Francisco. The committee of forty is as follows:

Mayor Eugene E. Schmitz, City Engineer Thomas P. Woodward, Major McKinstry, United States Army; Edwin Duryea, president of Engineers; Marsden Manson, civil engineer; William R. Hagerty, president Labor Council; P. H. McCarthy, president of the Building Trades Council; Supervisor Fred T. Nichols, president of the Carpenters' Union.

Architects—William Curlett, James Reid, Frank Shea, Willis Polk.

Builders—Jeremiah Mahoney, Jeremiah Deneen, C. E. Loss.

Attorneys—Garret McEnerney, J. E. Reinstein, A. Ruef, W. M. Metson, Gavin McNab.

United Railroads—Thornwell Mullaly, Tirey L. Ford.

Southern Pacific Company—E. H. Harriman, W. F. Herrin.

Western Pacific—W. J. Bartnett, Virgil Bogue.

Ocean Shore Railway—J. Downey Harvey.

Santa Fe Company—Mr. McDonald.

Bankers—I. W. Hellman, J. D. Phelan, William Murdock, J. Dalzell Brown.

Real Estate Agents—Thomas Magee, J. R. Howell, G. E. Umbsen.

Individual Members—W. H. Leahy, H. E. Law, F. H. Hilbert, Rudolph Spreckels, W. J. Dingee, William Babcock, R. E. Hale, F. W. Henshaw, R. H. Countryman, Thomas F. Graham, F. J. Murasky.

Superintendent of Golden Gate Park—John McLaren.

As Advisory Members—D. H. Burnham, John Galen Howard and Benjamin Ide Wheeler.

The Mayor also announced the appointment of the following auxiliary committee of citizens to work in conjunction with the Supervisor's committee:

William Curlett, architect; J. Deneen, builder; Mr. Berkeley, structural engineer; Wm. H. Leahy, building committee; Frank Shea, architect; J. W. Mahoney, builder; A. Ruef, attorney.

Lessons of the San Francisco Earthquake and Fire

By CHARLES W. DICKEY, Architect

THE great earthquake and fire in San Francisco have taught us many lessons in construction. A vast amount of exceedingly bad construction has been laid bare, but, what is more important, some of our so-called good buildings have failed utterly. Most of the fine modern brick and stone buildings of which we were so proud were of Class B, of Class C construction. These were all more or less damaged by the earthquake and were entirely consumed by fire. This form of construction, viz.: brick walls supporting their own weight and a part of the floor loads, with interior columns and girders of steel and with wood joists, might as well be prohibited at once for buildings of more than four stories. The brick walls crack and crumble in an earthquake and the large amount of woodwork makes a fire disastrous. So-called fireproof buildings, in which the brick walls were self supporting, also behaved badly. A high brick wall should not be allowed in any class of construction.

But with all the discouraging failures, one class of construction stood the test fairly well. I refer to the buildings of steel cage construction with fireproof floors and partitions. These buildings stand conspicuously among the ruins and are, in most cases, structurally intact. But a close examination shows many weak points even in these. The tile floors, wherever subjected to intense heat, have failed miserably. The flange tile has spalled off, allowing the flames to reach the steel beams which have sagged and in some cases have collapsed. The tile partitions have failed utterly and the metal lath and plaster partitions have not stood much better. The latter have the advantage, however, of being more easily repaired.

The re-inforced concrete floors have stood wonderfully well in all cases, and wherever steel has been encased in concrete it has proved invulnerable.

The advantage of re-enforced concrete over brick construction is clearly shown in two instances: In Alameda a two-story re-enforced concrete building stands intact, while a brick building about 50 feet away is badly wrecked. In San Francisco, at 13th and Mission streets, a warehouse was in process of construction with brick external walls and interior columns, girders and floors of re-enforced concrete. The brick walls are completely shattered, but the concrete work does not show a single crack.

Stone facing has been a failure wherever exposed to the fire and many stones were cracked and displaced by the earthquake.

The following are a few of the conclusions that may be drawn from an examination of the effects of both earthquake and fire:

Steel cage construction is unquestionably the best, but it should have gusset connections; the floors should be of reinforced concrete, all structural steel should be entirely enclosed with concrete, and the external walls should be of brick, terra cotta, or concrete, thoroughly secured to the steel frame. A curtain wall of re-enforced concrete with the net work of re-enforcement entwining the columns and sprandrel beams and with the brick facing bonded into the concrete with a course of headers in every sixth course, would seem to be the best thing for walls.

All sash and doors and their frames should be of metal, filled with cement, and all trim should be of metal. All elevators and stairways should be separate and should be enclosed with fireproof partitions or wire glass. All woodwork in partitions should be eliminated and in office buildings linoleum should take the place of wood floors.

It would probably be wise to limit the height of buildings of this class to twelve stories.

Buildings not exceeding six stories might well be built entirely of reenforced concrete and faced with pressed brick or terra cotta, thoroughly bonded into the concrete. It would seem reasonable to limit the height of buildings with self-supporting brick walls to four stories, and in all cases cement mortar should be used with possibly a little lime added to make it work smoothly. All face brick should have a row of headers every sixth or seventh course instead of depending on either metal anchors or a clipped bond.

Wherever wooden joists are used they should be most thoroughly and effectively anchored to the walls both at ends and at sides and so arranged that they will tie the building together in an earthquake, but so that if burned they will be released so as not to pull down the walls when they drop.

These lessons, with many others, may prove of great value in the remodeling of the San Francisco building laws.

* * *

Exhibit of Arts and Crafts, Los Angeles

THE first annual exhibit of the Arts and Crafts Society was given during the last four days of March in the auditorium of the Ebel Club Building, Los Angeles, and was an acknowledged success.

The exhibit included oil and water color paintings of excellent average quality by a dozen local artists. Other features included miniatures on ivory from New York and San Francisco, as well as Los Angeles, an interesting collection of architectural drawings and photographs, a series of the now well-known "Beaumont Prints" by Hector Alliot, including his very remarkable composit photograph of the likeness of Our Savior, book plates, photographs collected from all parts of the United States, in itself an interesting exhibit; executed designs for wrought iron and other metals, and a representative selection of "Craftsman" furniture. Fine exhibits were those of Carl Enos Nash and a few pieces of furniture made of highly polished and beautifully marked wood loaned by J. E. Klippert. Mr. Nash exhibited for the first time a very unique round dining room table which is capable of being enlarged, yet retaining its circular shape, a number of ancient books dating back to the earlier days of printing, among which were a few pages from an illuminated Mss. Bible of about A. D. 1480.

The San Francisco Guild of Arts and Crafts was splendidly represented in all its branches. The "Arts and Crafts" of Santa Barbara furnished some of the most charming work in metals and shells applied to electric lighting fixtures. The "Arts and Crafts," which is less than a year old, has fully vindicated its existence and has thus early proved its usefulness by demonstrating to the public, several thousand of whom visited the exhibition, that Los Angeles is the home of an unsuspectedly large number of very capable workers in the applied arts. This artistic success may be fairly attributed to the efforts and forethought of the president of the society, R. Mackay Fripp, loyally assisted by several of the members.

Among a number of other highly interesting and commendable exhibits under the direction of the Ebel Club, to which the entire building of the Ebel Club was given, were the Colonial, Indian, Oriental, Spanish and Educational. The Educational exhibit was designed to show what the public schools of Los Angeles are doing in the line of the arts and crafts, consisting of examples of work from the Kindergarten to the first year work in the Polytechnic High School.

The work shown from the Polytechnic was remarkably fine, consisting of work benches, architectural drawings, tables, chairs, book shelves, and artistic textiles, wallpaper, magazine cover and other decorative designs.

* * *

Says Owners Are at Fault

Architects Can Build Fire-Proof and Earthquake Proof Structures, if Sufficient Money Is Allowed

By O. A. JOHNSON, Head Draughtsman for Meyers and Ward, Architects

OUR city of the Golden Gate, the western Mecca of the tourist, is gone from us, and we who knew and loved her so well shall miss her as long as we live.

As I gazed over the ashes of the ruined city, I recalled how in days gone by we draughtsmen used to condemn the ramshackle buildings of the downtown district as we sat in court over the beer table of some Rathskeller.

Many a block we condemned to the flames, but always with the proviso that the tenants would save their belongings and lives. We were humane, for draughtsmen have tender hearts. All we wanted was the shanty razed that a more useful and grander building might adorn its site.

Little did we dream how terribly our sentences were to be carried out. We could not conceive then the idea that a higher court had overrulled all our motions and passed judgment on office buildings, mansions, warehouses and shanties alike.

Let us pray that this same high court shall see fit to subpoena some individual who can bring order out of chaos, and furnish him with ideas for planning a city more beautiful and grander than the human mind has yet thought of.

We have listened to lots of talk about a "City Beautiful," and have read columns of manuscript telling us how we can obtain it. Beautiful pictures have been shown us, pictures that were rendered by men skilled in the art of planning and beautifying large cities. These pictures and the manuscript are now in the possession of our City Fathers and now a terrible calamity has laid bare an immense area of the city and given the promoters of the "City Beautiful" a chance to make good.

Wild and disjointed talk of wide streets here and there, and only "Class A" buildings within certain limits will not help to build our city up. A committee of level headed and cool men, picked from the ranks of the merchants, professional men and artists, should be appointed to draft a new set of building ordinances and plan a scheme for the rebuilding of the city. This committee should be carefully selected and architects and engineers of good standing should be in the majority.

The aftermath of all great calamities is wild talk about how to avoid a repetition. So in San Francisco today, we hear that brick will never do for a building material because it is so easily shaken down. Those who say this have not stopped to consider how the walls that fell were built, nor how the mortar was mixed and laid on. This is only one of a thousand wild ideas that are advanced, but unless sound men have in hand the replanning of the city, this kind of talk will have its influence.

Quick action must be the by-word of this committee, so that capitalists who wish to rebuild immediately will not get discouraged and quit. It would be a crime to neglect this opportunity for building the city on the lines laid out by Mr. D. H. Burnham, and it would be a greater crime to hamper the city's growth by enacting some foolish building laws.

Van Ness avenue was no doubt the means of saving the Western Addition, and Dolores street saved the Mission. This fact suggests the idea that we have more streets like these in the new city. Primarily, they should be placed for better fire protection, but with a little study they could probably be placed so as to connect with our small public squares, these in turn, to have a broad boulevard surrounding them.

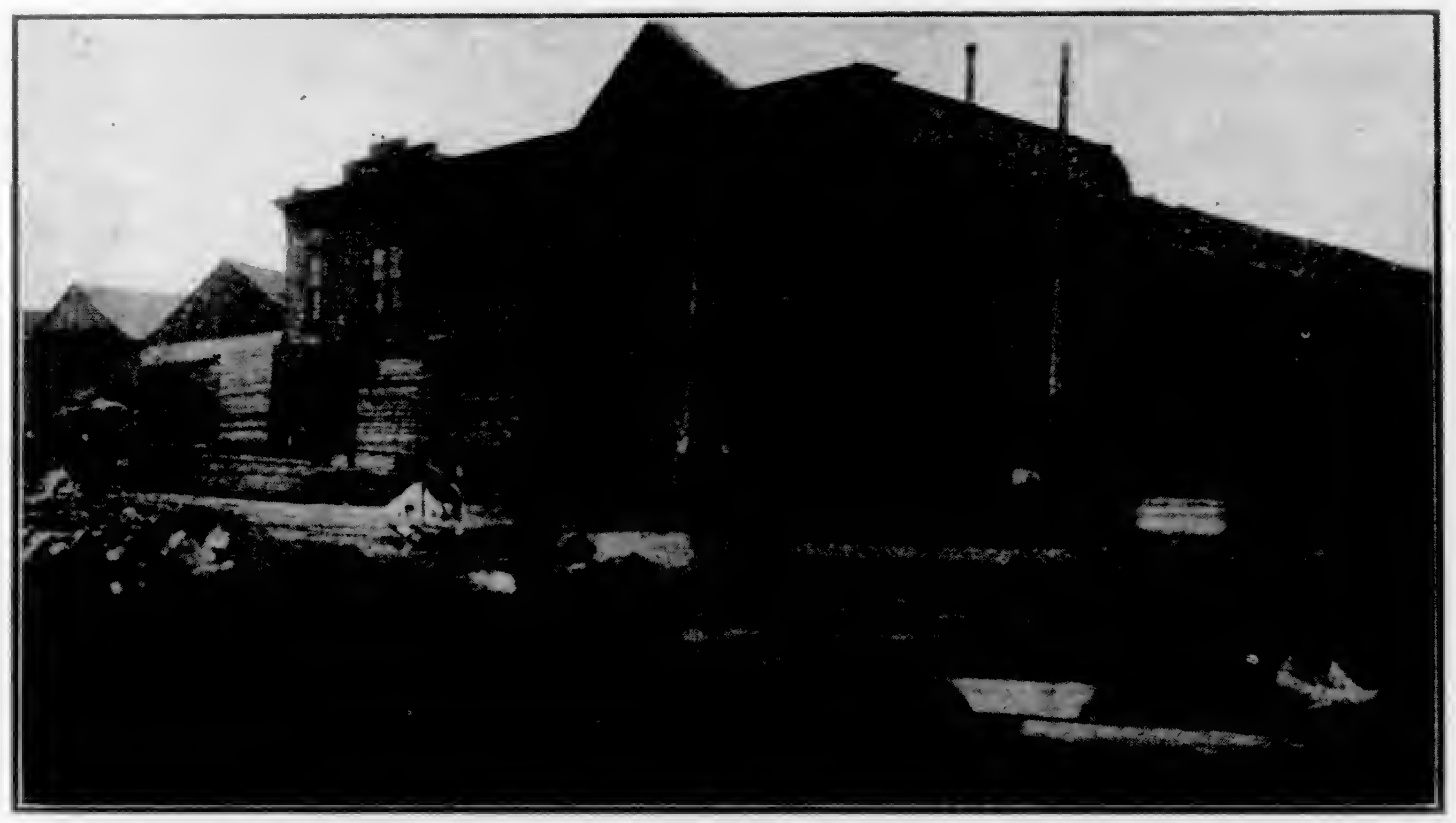
Every few blocks a small grass plot and trees could be planted in the center or at the sides of these boulevards or shade trees could be planted at intervals all along the sides. These avenues will be the future driveways of the city and should be made attractive as well as useful.

What the oasis is to the desert traveler, so would the public squares be to the sightseer after he has driven by the blocks of buildings.

Out on the dome of what was the City Hall, a Goddess is keeping silent vigil over the ruins. She is smoke grimed and dirty, but still unshaken and holds aloft her torch of enlightenment, seemingly trying her best to guide us in our struggle to rebuild. She is typical of the San Francisco spirit—defiant and hopeful in the face of misfortune.

This for the calamity howler. It was on built ground that buildings sank, and it was poor construction where brick walls fell.

There are, and always have been, architects in San Francisco who can build earthquake and fire-proof buildings when the owner is willing to pay the price. The building laws do not need half as much correction as the owner.



White Bros'. Lumber Mill. This Picture is Unique in That the Building and Great Piles of Lumber Escaped Destruction Although Fire Raged on all Sides. It Is the Only Hardwood Lumber Yard in San Francisco that Was Not Burned.

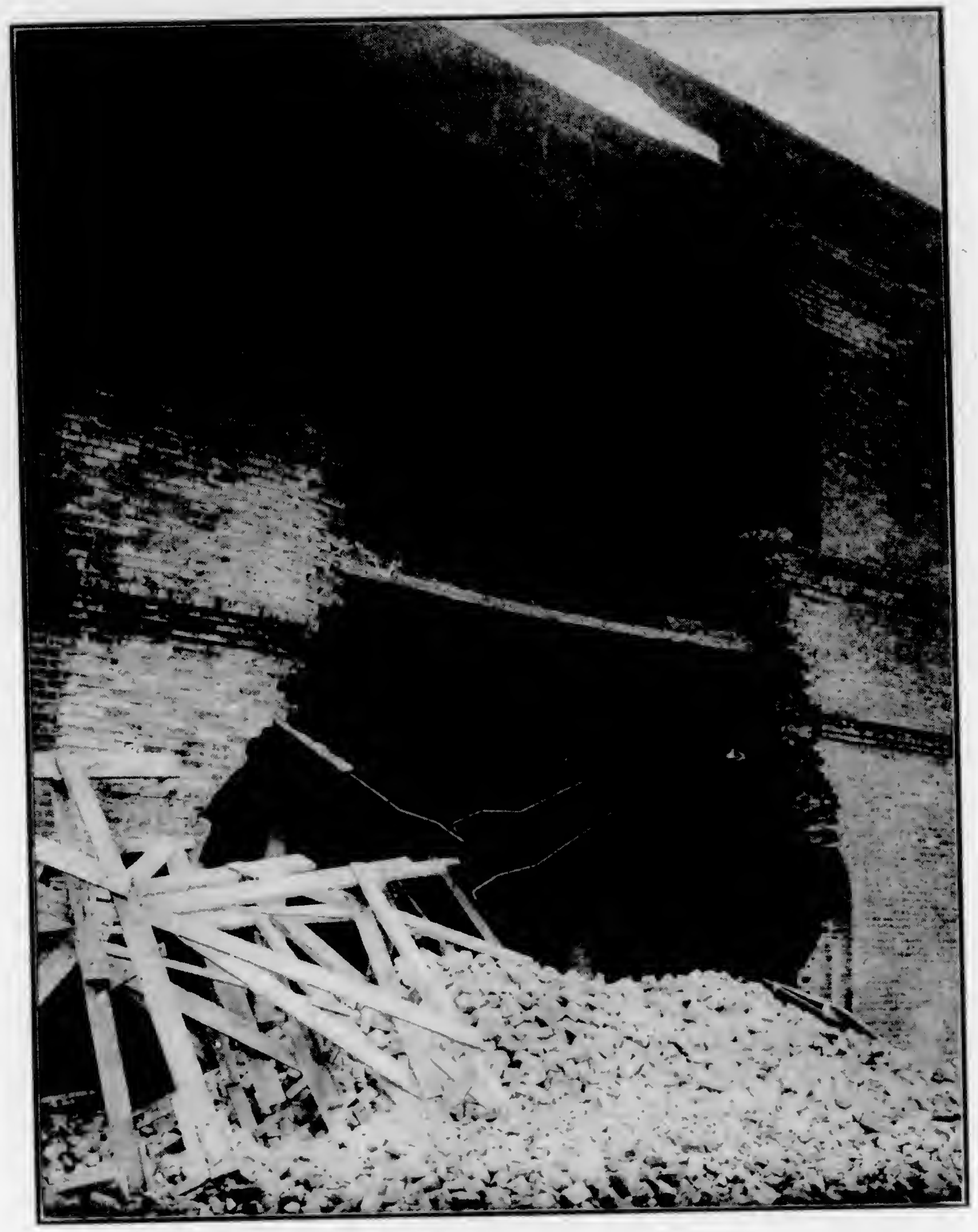


Fig. 4. The Casa Calwa Building, Townsend Street Near Third, Showing How the Reinforced Concrete Floors Remained in Position After the Supporting Walls Had Been Demolished by Explosions in the Adjoining Building   Meyer & O'Brien, Architects

Wired for Eastern Architects

MANY of the San Francisco architects wondered why so many members of the profession in the East hurried to the Coast immediately after the burning of the city. The following from the editorial columns of the Pittburg, Pa., Leader, of April 23, throws some light on the subject:

"Those persons who have been discussing the future of San Francisco and asking whether the city will hold her position as the metropolis of the Pacific Coast have had their question answered by a telegram from the Mayor of the ruined city to the Mayor of Pittsburg. It is so eloquent of the future that it is easily the most notable message from the city since the catastrophe. (?) It reads:

" 'How many architects or architectural draughtsmen can you furnish us, and how quickly can they leave for San Francisco?' "

Architects Offer Their Services

AFTER the big fire members of the architectural profession met at the residence of William Curlett at the corner of Pierce and Vallejo streets, San Francisco. Henry A. Schulze, president of the State Board of Architecture, stated that the purpose of the meeting was to offer the services of the architects to the civil and military authorities for bringing order out of chaos. No time should be wasted in technicalities, Mr. Schulze said, the object being to get down to business as quickly as possible.

John Galen Howard spoke of the great possibilities which were now offered to aid the authorities in making San Francisco the greatest city of modern times. It was resolved that those present volunteer their services in the inspection of the safety of buildings, or in any other capacity whatever, and it was so ordered.

J. W. Reid, John Galen Howard and William Curlett were appointed to wait upon the authorities to offer the aid of the architects in the reconstruction of San Francisco.

* * *

Skyscraper Entirely of Steel

SAN FRANCISCO is to have a fifteen-story steel building constructed after the manner of an ocean liner or a battleship. All the walls are to be of steel plates. This will be the first building of this kind in the world.

Thousands have noticed the steel frame of a building in course of construction on the north side of Geary street, between Grant avenue and Stockton street. It is the George Whittell building and the framework withstood the fire. Since the conflagration Architect Frank Shea of the firm of Shea & Shea has had a consultation with George Whittell. Shea suggested that the building would be both fire and earthquake proof if no masonry was used in its construction. Whittell gave Shea authority to do whatever he thought was best, and as a result the walls instead of being stone will be of steel.

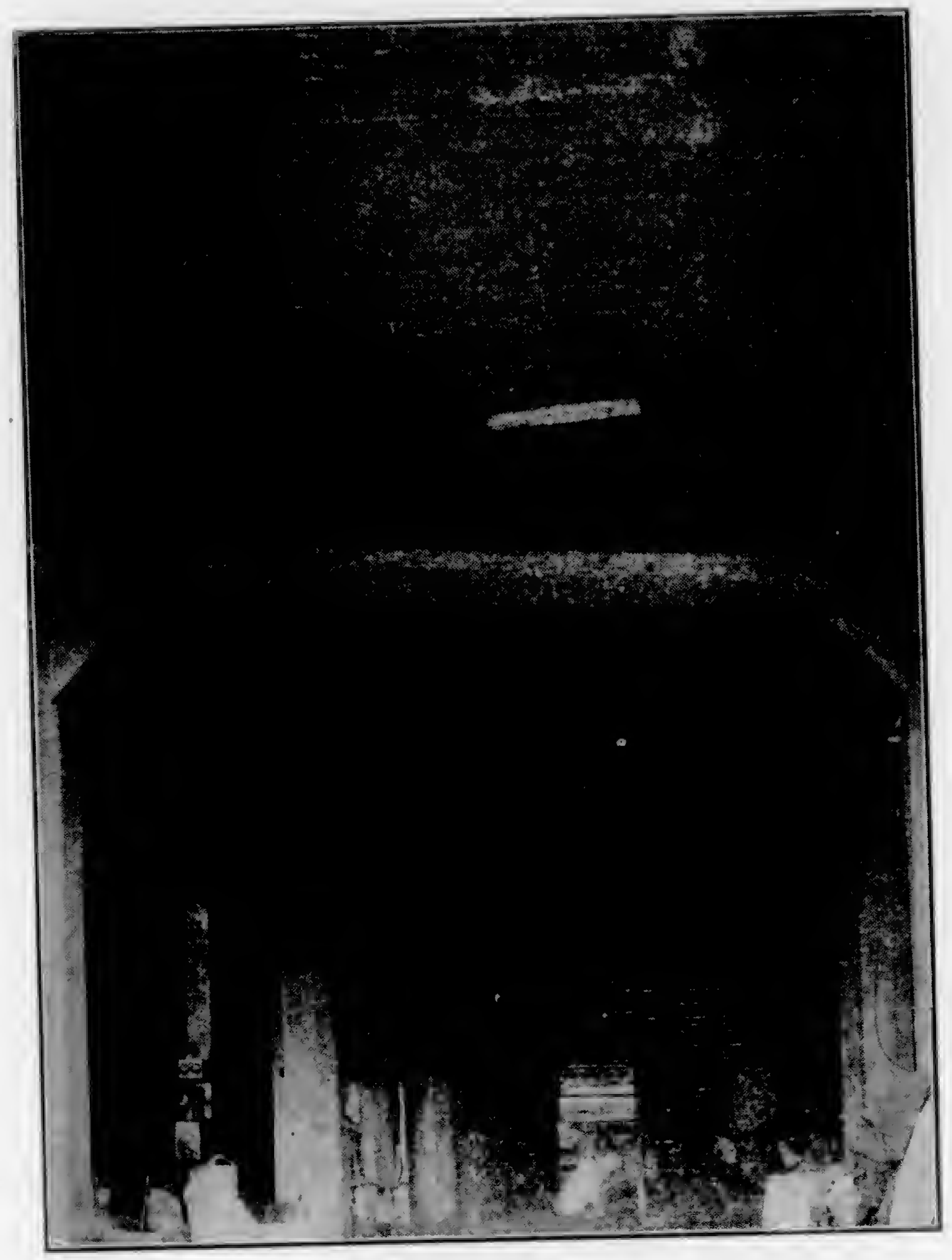
The building will cost $275,000, and will be ready for tenants in six months. The different floors will have partitions placed in position until prospective tenants select the area of floor room they require, and then the walls will be placed in position to suit them.

"It will be the first steel building erected in the world," said Frank Shea "and I am sure that it will be the most up-to-date style of building and that thousands will be copied from it."

* * *

Women and Wine

Women and wine, together they shine
On music and poetry's page;
And right they should, for however good
They are both improved by age.—
William J. Lampton, in the Bohemian for May.



Interior View of the Bekin Van and Storage Warehouse
Ralph Warner Hart, Architect

Bekin Building an Example For Reinforced Concrete Advocates

By RALPH WARNER HART, Architect

THE fire resisting quality of reinforced concrete has again been demonstrated. There is no longer any question that well made concrete used as fire-proofing is superior to any other material practical to use for this purpose. We have, however, learned in addition that there is no material or construction so stiff and strong and so qualified to resist shocks as this same reinforced concrete.

This is especially demonstrated by the condition of the two completed stories of the Bekins warehouse (see photographs) which I have under construction on West Mission street near 13th, and which will be six stories high. In spite of the fact that all this work was green, the third floor slab having only been completed Saturday, May 14th, the reinforced concrete columns, beams and floor slabs are absolutely undamaged and uncracked by the earthquake. The only damage to the work was by fire, and this damage due solely to the fact that the concrete was green and wet, having been wet down with a hose every day.

That this building was subjected to a severe shaking is evidenced by the condition of its brick outside walls which are cracked and shifted out of place to such an extent that some parts of same must be taken down and rebuilt. The undamaged condition of the reinforced concrete is the more remarkable in view of the fact that it had to assist in holding the outside walls in place instead of having the walls assist in stiffening the inside structure.

It must also be borne in mind that no steel reinforcement was introduced with the intention of resisting earthquake shocks. The whole design of the structure was simply for the usual dead and live loads of a warehouse. This is the best evidence in favor of the contention of reinforced concrete designers that this construction produces a monolithic building so bonded and tied together that no other construction can equal it for stiffness and rigidity.

Without doubt the splendid showing made by this partially erected building will have the greatest influence in determining the kind of structures with which to replace the buildings destroyed by the recent fire in San Francisco.

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San Francisco Architects' Club Meets

By C. E. ROESCH

THE spirit of determination to follow all pursuits as if there had been no interruption, was beautifully exemplified by the large attendance of members and the degree of interest shown by those present, at the regular monthly meeting of the San Francisco Architects' Club, held at their temporary quarters, 2411 Clay street, San Francisco.

Plans for the future were discussed, committees were appointed, and the general club business was transacted in the customary way.

A committee composed of the following members was appointed to find permanent quarters: A. R. Johnson, chairman; Wm. Crim Jr., Thos. Smith, and M. B. Betts.

All members are requested to register their new addresses. They should be sent to the present address of the Club, where they will be entered on the records. Also all draughtsmen who are not members of the Club, and draughtsmen from other cities are invited to place their names and addresses on file, and every assistance will be given them in securing positions.

All those who know of positions, and architects in need of draughtsmen are requested to communicate with the Club.

A special meeting of the directors was called for Wednesday, May 16th, to consider the reports of the various committees on location, etc.

Mention was made of several new firms having entered the field, of interest to architects.

Wm. Crim Jr. and Earl Scott have opened offices at 1400 Webster street, and are prepared to do architectural draughting and the construction of buildings.

Mr. C. F. Archer is associated with Mr. H. C. Corwin, as Architectural Engineers. They are being consulted relative to the cost of Class A buildings, and their advice is being eagerly sought by prospective builders. They have several projects of importance under consideration, which only await the preparation of the new building ordinance.

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SAN FRANCISCO THE CITY BEAUTIFUL

As Chicago, Boston, Baltimore and other great business centers recovered from the terrible loss they sustained by fire, so will San Francisco rise from the blackened ruins of her former self—ruins which followed in the wake of the flames which swept the city April 18 and 19—to be a greater, a grander and a more prosperous city than before the disaster. As far as possible the city is to be rebuilt along the Burnham plan with wide streets, and many parks and boulevards. The city will be so constructed that a repetition of the recent disaster will be impossible. Streets will be changed, driving thoroughfares widened and beautified and property will be condemned wherever and whenever such process will work to the general good of the community. Great parks and avenues will tend to stop the spread of flames and there will be independent water systems for different sections of the city, so that the entire municipality will not be dependent upon a single main pipe line as was the case before the fire.

The rebuilding of the new San Francisco has already begun. An army of architects, engineers and surveyors has been at work since the day following the conflagration and with the removal of the great piles of debris will come the active construction of new and modern buildings.

It should not be many months before the city will have at least half a dozen great office buildings ready for occupancy, since all those structures upon which work had been started before the fire are intact. Among these is the Butler building, facing Union Square, Monadnock building, Kohl building, Whittell building on Geary street, the addition to the Chronicle building, the Atlas building and several others.

Fortunately, the plans and specifications for the new twelve-story Head building for Stockton street, William Curlett, architect, the sixteen-story

Schroth building for Union Square, Cunningham & Politeo, architects, and the Humboldt Bank building, Meyer & O'Brien, architects, were saved, and construction work on all these great fire-proof structures is to begin at once.

It is interesting to note that none of the class A buildings were damaged in the least by the earthquake. This is vouched for by architects and engineers who visited these buildings before fire wrecked them. But even the fire unharmed the steel work and the only damage done was to the brick and stone. The fire has demonstrated very forcibly that the Romanesque arch and heavy cornices of stone or terra cotta are undesirable. The arches shattered and collapsed under the vibrant strain, while stone and terra cotta cornices were displaced and hurled in fragments to the streets below. The so-called fire-wall also failed to withstand the seismic convulsion, being flung broadcast, mere fragments of brick and mortar.

This was not San Francisco's first baptism of fire. Three times in the early days it was almost wiped from the map. Yet it began business again on the smoking ashes and rose from its ruins a greater city than before. The property losses of the present fire are vastly greater than those of the early fifties. It is, indeed, the most colossal destruction suffered by any modern city. The record set by Chicago has been passed.

San Francisco has set about to rebuild with confidence. In five years the once great business center, now in ashes, will have risen again, a glorious monument to California pluck, energy and indomitable courage.

* * *

THE BURNHAM PLAN

The Burnham plans are admirably conceived, and can be carried out, for they are founded on basic principles. The plans should now be carried out, not primarily because of the beauty of the effect to be created, but because of the convenience involved in the arrangements. The plans provide for taking care of traffic and for making each part of the city accessible to the people in every other part.

Wide avenues or boulevards should divide the city into sections, these boulevards serving not alone as ornamental driveways, but as protection against the spread of fire. The hill summits should be crowned with parks and reservoirs established in them. Van Ness avenue could be widened and parked.

The business center of the city should be where it has always been—where it has grown up as a matter of convenience.

Underground electric street railways should certainly be established and cable lines and trolley lines be abolished. There is no uglier thing than an overhead trolley line on a main street. Its only excuse is its cheapness.

I have always believed in the great future of San Francisco, and today my belief is stronger than ever.

JOHN GALEN HOWARD.

* * *

THE MAN OF THE HOUR

Probably no man who has given of his time and money and influence for the relief and upbuilding of the stricken city has so endeared himself in the hearts of the people of San Francisco, and, in fact, the entire State of California, as Mr. Edward H. Harriman, president of the Southern Pacific Railroad Company. No sooner had the news of the calamity reached Mr. Harriman at his office in New York City than he hurried West in a special train and telegraphed ahead a personal contribution of $100,000 to the relief committee and instructions to his subordinates in the great company of which he is the head to move without delay and without charge food supplies from all points of the compass intended for the relief of the homeless. Besides this he ordered that refugees be given free transportation over all the Harriman lines, and this magnanimous act enabled hundreds of unfortunates to leave the stricken city who otherwise would have been cast upon the then badly overtaxed and overworked Relief Committees.

Mr. Harriman has indeed done a service to San Francisco which, no matter how great his personal interests may have been, could hardly be excelled by any individual or corporation. His offer to produce a loan of $100,000,000 that the people may borrow at small interest enough money to rebuild their burned buildings, was still another expression of good will and generosity that should not be overlooked. Mr. Harriman is the type of American who believes in doing. Like Roosevelt, he is an ardent student of the strenuous life. No better example of this could be had than the record of what he has done for San Francisco in the past four weeks. The following, spoken by Mr. Harriman at a meeting of the Committee of Forty, is characteristic of the man:

"I feel less qualified than any man here to begin the making of suggestions. My advice in a nutshell is to start work. We ought to work more and talk less. Mistakes may be made by going ahead, but I don't care if we do make mistakes. It is better to do something than to stand still. If mistakes are made they can be remedied, but unless there is action there is sure to be a loss of spirit. I don't care where or how the start is made. For myself I can say that, although I would pay a man to do the work if I could get him, I would pitch bricks to clear the way. Do something and the work will all be done."

* * *

BRICK WELL LAID IS ALL RIGHT

The usefulness of the brick building has by no means been impaired by the crumbling of so many structures built of this material in the earthquake. The main fault appears to have been with the poor grade of mortar used, as in nearly every case where first-class cement was applied and the bricks had been properly built around a steel frame, there was no crumbling, or cracking, to speak of. Instances of this were the new Chronicle building and the Monadnock building, besides several of the big warehouses.

* * *

REINFORCED CONCRETE IN THE NEW CITY

The insurance people are going to insist on a broad policy being followed by the Citizens' Committee in framing new laws for the rebuilding of San Francisco. They realize that it is to their interests to have the city rebuilt in a manner that will make it as safe from future fire losses as modern construction will permit. They propose to do everything in their power to prevent a repetition of the conflagration which laid waste $350,000,000 worth of property. Besides the insurance interests there are many influential business men and large property owners who are equally desirous of having ordinances framed that will permit of a class of construction which will be as near fire proof and earthquake proof as possible.

Reinforced concrete now seems to be the most generally favored material and some of the most pretentious buildings, for which plans are now being made, call for this class of construction. Many buildings will be built entirely of reinforced concrete while others will have reinforced concrete foundations and interior walls.

It has long been an open secret that a certain element in San Francisco is opposed to reinforced concrete construction. Unfortunately, this element heretofore has been able to dictate to the powers that were. In consequence, the city ordinances have made it impossible for the tax payer, should he so desire, to build a reinforced concrete structure. The labor interests, we are told, fought against this class of building, believing that it would injure the business of masons. The brick men, too, have not taken kindly to concrete construction. While these objections were only natural when normal conditions prevailed, it is unreasonable to see how they can be taken seriously in the present emergency. There is enough building in prospect now to keep all branches of the industry mighty busy for years to come. Under the circumstances there is no good reason why reinforced concrete construction should not be given the same consideration and leeway as brick, stone and wood. Chicago, Seattle, Los Angeles, in fact, every city of any size in the west or east has taken up concrete construction and a single failure from a fire resistive standpoint is yet to be recorded.

If the authorities of San Francisco fail to accept and permit this class of construction in the rebuilding of our city, they will but prepare the way for a repetition of the awful disaster which nearly blotted the city off the map on the 18th of April last.

Failure to permit reinforced construction will not only delay and hamper the rebuilding of the city, but will prevent proper fire protection.

* *

SPARKS FROM THE FIRE

Every newspaper and trade publication in San Francisco was burned out.

To use an apt slogan of a well known dry goods establishment: "Watch us grow."

The future was never brighter for the San Francisco architect, and every one, in fact, who is in any sense connected with the building industry.

Colusa sandstone has proved to be an excellent fire resistive material. The Shreve and Kohl buildings demonstrated this. The earthquake, too, appeared to have little effect on the stone.

Good hollow blocks, well constructed, withstood the earthquake in a number of instances, notably at San Jose. On the other hand, inferior blocks, poorly laid, crumbled like so much dry plaster. The hollow block buildings at Palo Alto were badly demolished.

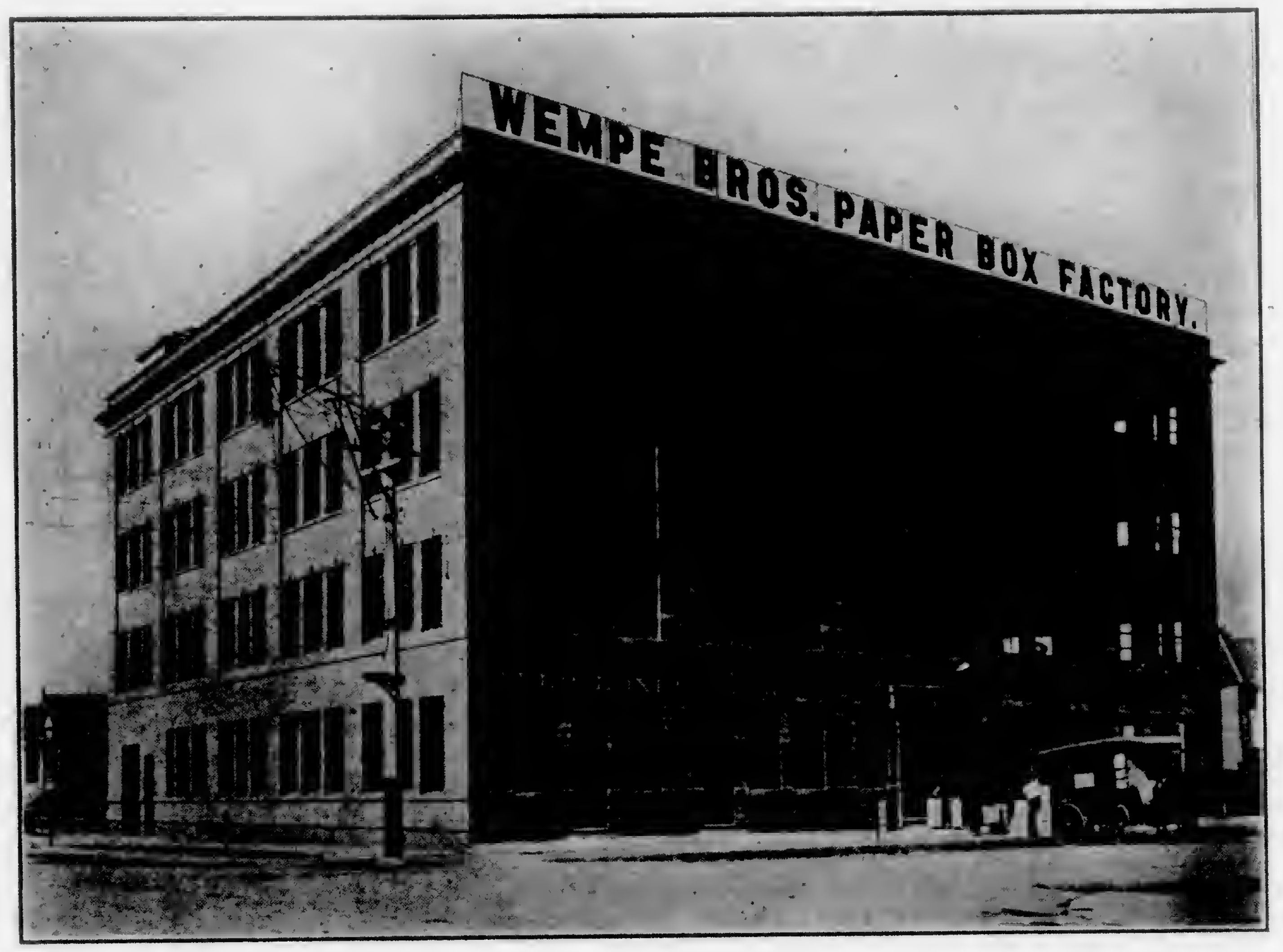
There should no longer be any question about the practicability and durability of reinforced concrete. Wherever this building material was used no damage resulted, either by earthquake or fire. Now let the authorities frame a building ordinance that will permit of the use of this kind of building material for complete construction.

The Architect and Engineer of California is just one year old. The publishers had planned a big anniversary number, but the fire not only wiped out our printshop but it destroyed many valuable manuscripts written for this special number, together with about 400 half tones and many costly photographs and priceless drawings.

We don't need those Chicago architects and engineers. There are plenty of good craftsmen right here in California who are quite capable of rebuilding a great city without outside assistance. It is kind of our sister city to send these men here, but building conditions are different in California from what they are in the east and no one understands local peculiarities better than our own architects and engineers. Hence we say, let our people build the new San Francisco.

Many valuable drawings were lost by architects in the fire. Some of these were unfinished sketches for new buildings. In practically every instance where anything was saved it was the draughtsmen whom the architect had to thank. Few architects realized the extent or seriousness of the fire until it was too late to reach their office. Probably no one firm succeeded in saving more of his office effects than G. Alexander Wright who, with the assistance of his draughtsmen, carried several wagon loads of data books, blue prints, and valuable drawings to a place of safety before the fire wrecked the building he occupied.

The Publisher's Corner



Wempe Factory at Oakland, Built af Concrete Blocks, Reinforced with Steel

Concrete Block Building Uninjured.

The substantial four-story building shown on this page is one of the few large structures in Oakland which escaped damage by the recent earthquake. G. A. Peterson, of the Interlocking Company of Oakland, was the contractor. The building is at the corner of Fifth and Adeline streets and is built of concrete blocks laid on a firm foundation of cement. The building is 54 feet in height above the first floor to the top of the fire wall. The stones or blocks on the first floor are 14 inches thick, while the walls above the first floor are 11 inches thick, reinforced by fire pilasters four feet wide and 14 inches thick. These are continued up to the roof line above which a nine-inch fire wall is built, varying in height from one to three feet above the roof. On the Adeline and Fifth streets sides an ornamental reinforced concrete cornice prejects 18 inches from the building. All the stones in the building are thirty per cent hollow, and in some cases, such as in the pilasters, square steel rods are introduced into the hollows of the blocks, the whole being made secure by the liberal use of cement.

On each floor, one stone above the window arches, a one-inch steel wire cable is laid in the wall, running entirely around the building. The extremely careful and painstaking way in which the building is constructed is shown by the fact that it was practically uninjured by the earthquake, a few minor repairs only being necessary. Within two blocks of this building a new glove factory was completely destroyed by the quake, while on the opposite side of the street is a single-story flax mill, the brick walls of which were demolished.

The Occidental Engineering and Machinery Company will take up reinforced concrete construction in addition to the regular lines of business followed by the company previous to the fire. The company has ample financial backing and a splendid staff of workers. One of the first orders for new machinery after the fire was placed with the Occidental people by the Pacific Cereal Association, the order being for a Corliss engine of the larger type. The company has also very recently placed an order for the Mailer Packing Company of Los Angeles for a direct-connected engine and generators, the first installment being for 225-horsepower equipment. This plant will be equipped entirely with motor-driven machinery, there being no power-transmitting devices outside of wiring for electric current. This will be the most up-to-date packing plant in the West.

The business of Talum and Brown mfroerly carried on by that well-known concern at Tremont street, has been taken over by purchase by the Occidental Engineering and Machinery Co. The old firm represented such well-known concerns as the Mundy Hoisting Engine, American Woodworking Machinery, Albany Grease and the Standard Railway Equipment Company.

The Pacific Heating and Ventilating Company has taken temporary offices at 2436 Folsom street, San Francisco. The company has started the erection of a new factory at Seventeenth and Mission streets which will be 110x60 in size and equipped with the latest improved machinery. Previous to the late fire the company secured the services of a very competent heating and ventilating engineer, who is still in the concern's employ.

The Enos Company of New York, who have conducted offices and display rooms in this ctiy for the past four years, and were, before the fire located at 110 Geary street, fared better than most institutions in the burned area, owing to the fact that one of their representatives was on the road with several trunks of material, consisting of all the photographs and designs, showing their complete line of gas, electric and combination fixtures. This fortunate circumstance enabled them to continue business as before, and with their unlimited factory facilities in New York, has made it possible for them to assist their less fortunate competitors by taking contracts off their hands and filling them from Eastern shipments, where they were compelled to execute their obligations.

The local managers had just placed a large order for all staple fixtures and electrical material, several weeks before the fire, and this stock is now in the warehouse, ready for distribution.

Phone Main 715
The J. Llewellyn Co.
Successor to G. W. CLARK CO. of S. F.
Dealers in
FOREIGN—DOMESTIC
WALL PAPER
Painters and Decorators, Wood Finishing, Paints, Oils and Varnishes, Picture Moldings, Window Shades, Art Glass Decorations
Burned out in San Francisco but All Right in Oakland
1325 BROADWAY
Opposite Post Office, Oakland

Ross McMahon
Awning and Tent Co.

TEAMSTERS' RAIN GOODS
BAGS, TENTS
AWNINGS, HAMMOCKS
and COVERS

Will resume business at the old stand

35 Market Street
San Faancisco California

Our attention was called to a machine being installed in the grill of the Occidental Hotel last month that should interest architects in the designing of the numerous hotels, restaurants and hospitals that will now be built in San Francisco. It was a machine for washing dishes and silver in large quantities, known as the New Century Dish-washing Machine, the manufacture and sale of which is in the hands of Harry Larkin, formerly of the Standard Roofing Company. His address is 4876 18th street, San Francisco.

The machine is a California invention and has been in use for the past three years in a number of hotels, hospitals and restaurants with perfect satisfaction. The machine being installed occupied a floor space of 30 by 60 inches, and had a capacity of washing 250 pieces per minute. The installing of this dish-washing machine economizes in space and does away with a considerable amount of plumbing as well as the usual line of sinks that are so objectionable.

Mr. Larkin had a catalogue in print at the time of the fire and intends sending one to each of the architects as soon as it can be again prepared.

IN THE SAME OLD PLACE.

"The Architect and Engineer of California:

"Gentlemen—We are to-day in receipt of your notice and beg to congratulate you on the up-to-date manner in which you are handling your end of the situation.

"We take pleasure in advising you that our office in the Atlas Building, Second and Mission streets, was not touched by the fire and we have had same opened for the week and are transacting business 'at the same old stand in the same old way.'

"For the benefit of the architects and contractors who have started in the rebuilding of San Francisco, we beg to advise that we are prepared to accept orders for our Bee and Lamb brands of foreign cement, by special steamer to San Francisco to arrive in about ten weeks; also Expanded Metal for partition and fireproofing. We have stock at the present writing of about one-half a million yards; also Common Brick and the other lines of building material which we are carrying, including Chimney Pipe.

"All communications addressed to us at Room 402 Atlas Building, 604 Mission street, will be promptly received through the main postoffice at Seventh and Mission streets."

First Elevator Company to Return After Fire.

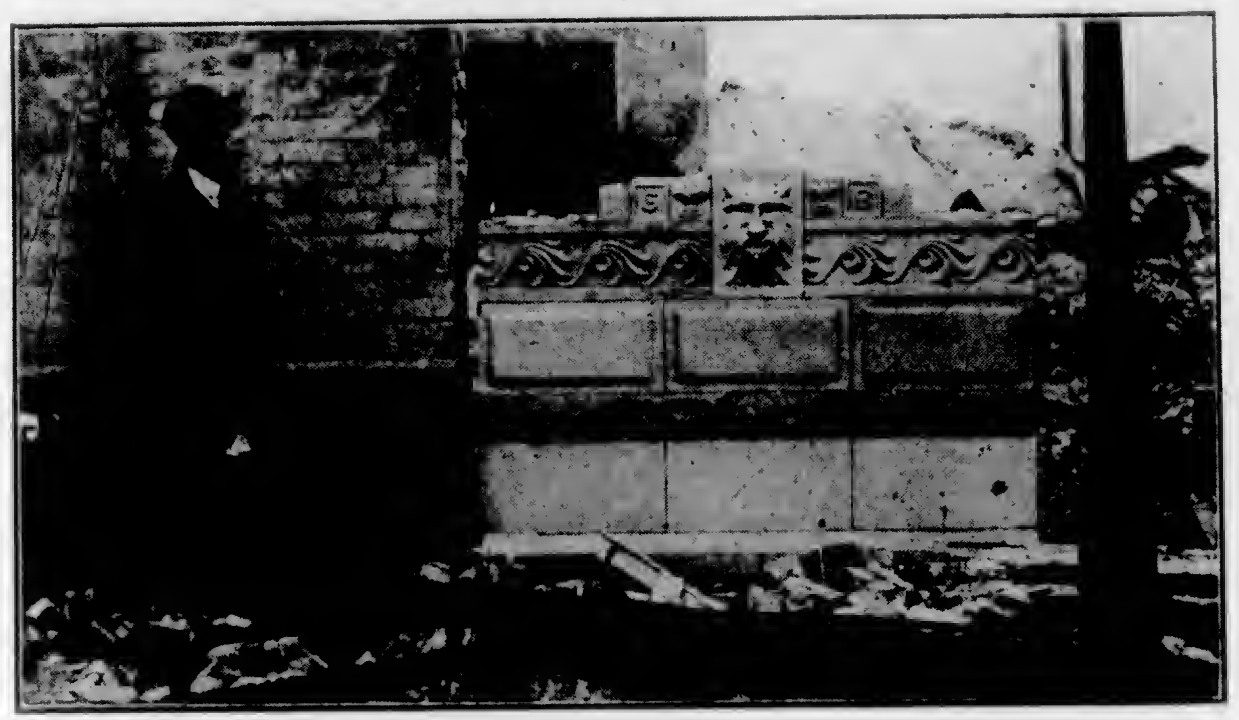
The Van Emon Elevator Company, which until very recently was the only California manufacturer of elevators not controlled by the "Elevator Trust," did not perished in the city April 18. The company has already roofed over the old brick walls of its machine shop, and in a few days the adjoining brick building will be ready to shelter its office force at the old number, 52-54 Natoma street, as early as Thursday, April 26. The Van Emon Elevator Company had its men at work in the cellar of the Natoma street premises jacking over the heavy machinery so that the carpenters could set in place the stout posts to support the floor girders. Meanwhile other men pitched a tent across Natoma street for an office, and in this tent a rush order was given to a large local machinery house for nearly $10,000 worth of machinery for immediate delivery. Other machinery and two gas engines for power had been ordered from San Jose and Los Angeles, and by May 18 (one month after its destruction by fire) the machine shop was started up. The buildings on Natoma street will be used for offices and a repair and erecting shop. In West Berkeley the company is building a factory containing 10,000 square feet of floor space on a piece of land with a frontage of 300 feet on the Southern Pacific Railroad close to the bay.

Empire Plaster Company
Manufacturers of Hard Wall Finishing and Dental Plaster

SPECIFICATIONS FOR EMPIRE HARD WALL PLASTER

Metal lath three-coat work:
First or scratch coat—One part Empire hard wall plaster fibred, two parts sharp clean sand (fresh water sand preferable). Thoroughly mixed and applied within two hours after mixed.
Second or browning coat—One part Empire hard wall plaster, two parts clean sharp sand floated up even with grounds.
White or putty coat—One part Empire finishing plaster, three parts line putty gaged with hard wall plaster.
Sand finish—One part Empire hard wall plaster, two parts clean sharp sand.
Wood lath, two-coat work—One part Empire hard wall plaster fibred, two parts clean sharp sand (fresh-water sand preferable), mixed thoroughly and applied within two hours after mixing.
White coat and sand finish same as for metal lath.
Finishing coat should be applied within 48 hours after first coat is put on.

16th and Harrison Sts., San Francisco
Oakland Warehouse ADAMS' WHARF
Phone Oakland 6821



Sample Wall of Concrete Stone which Resisted Perfectly the Heat of San Francisco's Big Fire.

ROMAN STONE

Guaranteed to be absolutely fireproof. This photograph shows the wall standing in front of the warehouse at 24 Sacramento St. Much cheaper than any natural stone. No stock patterns. We can make any design at slight cost over straight work.

Holmes Lime Company, Inc.

Exclusive Sales Agents 1904 Devisadero St., San Francisco

CONCRETE STONE PROVES FIRE-PROOF.

Going up Sacramento street, in front of the warehouse of the Holmes Lime Company, many viewers of the San Francisco ruins have been surprised to see standing in one of the doorways an exhibit of Roman stone, entirely unharmed by the fire. The stone was placed there about a year ago by the Pacific Stone Company. The bricks forming the doorway next to the exhibit were broken by the heat.

The manufacturers of Roman Stone have always claimed that the stone was fireproof and in this instance it would seem that it has surely been tested and not found wanting at a time when every natural stone failed. The foundation walls of the Fairmont are to have a four-inch finish of this Roman Stone made to imitate granite.

The name Roman Stone is given as the stone is guaranteed to compare with the finest concrete work ever done by the Romans.

Made under the Stevens' patents it offers itself to architects as being the only artificial stone susceptible to any design.

It is being accepted in the finest buildings in the East and over fifteen bank buildings have been erected in Canada.

The exclusive sales agents for Roman Stone is the Holmes Lime Company, who have temporary offices at 1904 Devisadero street, San Francisco.

BIG EASTERN CONTRACTOR COMES HERE.

At the present time, reinforced concrete, under the critical tests of the engineer, is opening an era in construction as distinct as that caused by the change from wood to steel construction, and there is accordingly a large and increasing demand for concrete work of the best type. It is to meet this demand that the Underwriters Engineering and Construction Company has been incorporated.

Since the destruction of San Francisco this company has sent part of its force to the Pacific Coast and is prepared to take contracts for new construction work and complete the same in the least possible time. The company combines under one management the engineering and construction, two departments of work usually in separate hands. Frank B. Gilbreth, one of the best known contractors in the United States, is connected with the underwriters' company and is now in the city for the establishment of permanent offices in the Atlas building. Mr. Gilbreth is the originator of a system in contracting that enables his company to handle large jobs with a promptness and satisfaction to the owner that are astonishing.

It may be well to say a few words about the organization of the purchasing department and especially of two of its sub-departments. The quotation and the list department maintains an up-to-date list of the various class of material which may be required and the place where such material is in stock. When a contract is secured in a new territory, this department immediately gets in touch with the various supply men in that vicinity, and a careful list is at once prepared and kept constantly revised of the stocks on hand in these stores. Thus the purchasing department has at its command the supplies of its regular supply dealers in the larger cities and also the supplies of the dealers in the immediate territory of the work on hand.

Mr. Gilbreth was one of the first large contractors of this country to introduce the cost—plus a fixed sum—contract plan. It has many advantages for the owner, giving him the benefit of cash discounts for materials enables him to make changes and alterations at any time without delaying the work, makes possible the massing of any number of skilled and carefully trained mechanics and a dozen other advantages not obtained by any other plan. Some of the great buildings of the world have been built by Mr. Gilbreth and his associates, and the testimonials owners have given him are of a high class.

The Pioneer Roll Paper Company of Los Angeles has opened a branch office in Oakland for the accommodation of San Francisco architects, builders and owners. Mr. H. R. Williar is in charge of the office, which is at 712 Union Savings Bank building, Oakland. Prompt shipments of material are made from the factory.

Although the Pacific Manufacturing Company's plant at Santa Clara was badly wrecked by the earthquake, the company has managed to keep nearly every department running since the shock, thanks to the enterprise and push of Manager Pierce, who has personally directed the rebuilding of the plant. The planing mill had to be entirely rebuilt and the management has used good judgment in making the structure more substantial than the old building by using heavier timber and corrugated iron on the outside. The vast acreage of lumber which the company has stacked up in its yards was unharmed, and all orders are given prompt attention, with no raise in former prices.

Big Stock of Material on Hand to Supply Immediate Wants

Steel Frames for Fireproof Buildings

Architectural and Ornamental Iron Work of All Descriptions.

Ralston Iron Works, Inc.

Temporary Office,
708 Broderick St., San Francisco, Cal.

W. A. BOSCOW,
Manager Oakland Branch

TELEPHONE
MAIN 581

FIRE
DIDN'T
HURT
US

PLENTY
OF
STOCK
ON
HAND

Redwood Manufacturers Co.

Redwood, Pine and Cedar Doors,
Windows, Mouldings, Mill Work,
House Finish, Tanks, Etc.

OAKLAND BRANCH:

FIRST AND ALICE STREETS

2 Blocks east of Webster Street Bridge

Take
Alameda Street Car

Removed
from 3d and Broadway

Only Lumber Yard Left.

For a great lumber yard standing directly in the path of the San Francisco fire to escape destruction, or at least some damage, seems little short of a miracle. Such was the good fortune of White Brothers' hardwood lumber yards at the corner of Spear and Howard streets. Several times the great piles of lumber were ignited, but each time the firemen and employees drowned out the flames, until finally the wind shifted and the fire swept on past the lumber sheds to devour other property.

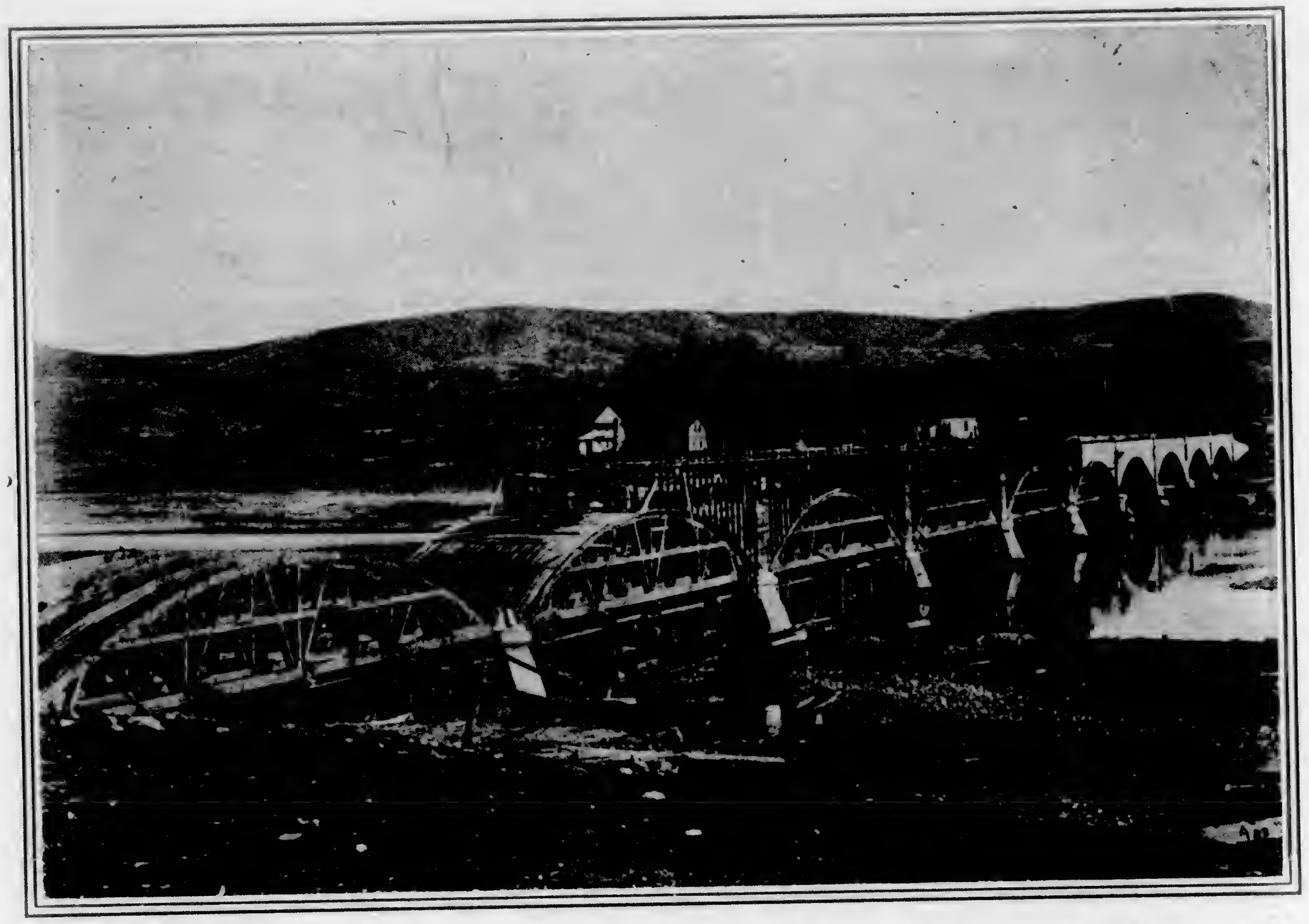
One of the oldest lumber firms doing business in San Francisco, it seemed altogether fitting that it should survive the conflagration, and again, as in pioneer days, become the leading lumber firm of the city. A. L. White, the senior member of the firm, is of the good old Maine stock, having journeyed to the Coast from the East in 1868. Soon after, Mr. White and his brother, Peter White, formed a partnership, which was continued successfully up to last August, when Peter White retired and A. L. White's son, W. T. White, became actively engaged in the business. He is at present the vice president of the company, while O. L. Gibson is secretary.

The company has occupied its present location at Spear and Howard streets for seventeen years. It has a floor area of almost 300 square feet. The sheds are at present filled with nearly, 1,500,000 feet of hard wood, including mahogany, walnut, cherry, maple, birch, etc., for interior finish, house finish and ship work. The company does a large business in imported Australian wood and Siam teak. Hard wood flooring of all kinds is carried, besides veneers for cabinetmakers' requirements.

The John McGuigan Company, with temporary office at 794 Elizabeth street, San Francisco, calls attention to the fact that they were only partly burned out, and have quite a stock of glass and castings ready for immediate setting. The company does repair work and is ready to contract for all kinds of fireproofing, with plenty of materials for immediate execution.

Blue Summit Lime.
HERCULES FIBER.
Union Brick Bonds.
Best's Keene's Cement
YOUNGSTOWN
EXPANDED
METAL
Portland Cement.
Mahoning Lath.
Union Lime Co.
209 San Pedro Street.
Both Phones 64.
LOS ANGELES, CAL.

Keystone Boiler Works
MAIN AND FOLSOM STREETS
SAN FRANCISCO
PACIFIC COAST AGENTS FOR THE
PARKER WATER TUBE BOILER
SELF CLEANING ABSOLUTE SAFETY
GREATEST ECONOMY
WRITE FOR CATALOGUE



Concrete Bridge at Pollasky, Ten Seventy-five-foot Spans, Reinforced with Corrugated Bars, Designed by Jno. B. Leonard, C. E.

Corrugated Steel Bars
FOR
Reinforced Concrete

These bars are carried in stock in San Francisco and can be furnished in any length up to 30 feet. Special designs for any class of work in reinforced concrete furnished free of charge.

Send for Catalogue

JOHN B. LEONARD, C. E., Agt.
Temporary Office,
272 Bacon Building, Oakland
After June 1, Monadnock Bldg., San Francisco

One of the first San Francisco firms to find temporary quarters after being burned out was the Otis Elevator Company. Within four days after the fire, Manager Berger had installed himself in desirable offices in the Delger building, Oakland, and a day or two later another office had been rented in San Francisco. Since then the company has been ready for business and is probably in a better position to make good this assertion than any other elevator company in the city. The Otis works in Seattle, Los Angeles and other coast points will be able to supply the demand in San Francisco and vicinity until the factory in the latter city can be rebuilt.

George J. Wellington, engineer, whose office in the Kohl building was unharmed, claims the distinction of buying and installing the first motor in San Francisco after the fire.

W. E. Dennison, President James H. Bishop, Secretary L. A. Steiger, Manager

STEIGER TERRA COTTA and POTTERY WORKS
MANUFACTURERS

ARCHITECTURAL TERRA COTTA
SEMI-DRY PRESSED BRICK
VITRIFIED SALT GLAZED SEWER PIPE
HOLLOW TILE FIRE-PROOFING
TERRA COTTA CHIMNEY PIPE
ELECTRIC CONDUIT TILE, DRAIN TILE

BRICK MANTELS
TILE MANTELS
URNS AND VASES
LAUNDRY TUBS
KITCHEN SINKS
FLUSH TANKS

ACID JARS
ACID PIPES
ACID BRICK
FIRE CLAY
MODELING CLAY
FIRE BRICK DUST

FIRE BRICK FIRE TILE

MAIN OFFICE AND SAN FRANCISCO YARD
EIGHTEENTH AND DIVISION STREETS
FACTORY
SOUTH SAN FRANCISCO, SAN MATEO COUNTY

ARTIFICIAL MARBLE, SCAGLIOLA AND IMITATION CAEN STONE
SPECIALIST IN IMITATION GRANITE

KNICKMANN & NOCENTI
Contractors for the New Fairmount Hotel

HIGHEST GRADE WORK FOR WAINSCOT, COLUMNS, PILASTERS, PANELS, BALUSTRADES, MANTELS, ETC.
525, 527, 529, 531 WEST 26TH STREET, NEW YORK CITY

Our Pacific Coast Representative is the
T. V. GALLASSI MOSAIC COMPANY
TELEPHONE FELL 9246

WE INVITE COMPARISON
Factory and Show Room 1121 Fell St.
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Barrett's Amatite Roofing

AMATITE ROOFING is water, wind and weather-proof; it is fire retardant; it will not take fire from sparks or embers falling on the surface. It is easily and quickly applied. No skilled mechanic is required to lay Amatite—any man can do the work by simply following the instructions which come with each roll. Requires no painting.

JEFFERSON SASH CORD—Strongest, Cleanest, Whitest Sash Cord on the market

S. F. WEEKS COMPANY
139-141 Berry Street SAN FRANCISCO

IF YOU WANT
Structural Iron Castings
Which will Stand the Test, Place your Orders with
BENECIA IRON WORKS
TRUSS AND ANCHOR RODS, BOLTS, RIVETS AND SPECIAL FORGINGS
WORKS, BENECIA, CAL. City Office, 517 Eleventh Street, Oakland, Cal.
Phone, Oakland, 7584

SALT LAKE ROUTE
UNION PACIFIC THE OVERLAND ROUTE
THE NORTH WESTERN LINE

This is the Way it Runs

Los Angeles Limited to Chicago
(Salt Lake Route, Union Pacific and Northwestern)

EVERY DAY. THERE'S NONE BETTER

A-la-carte Dining Car service and every comfort and luxury known to progressive railroading. Try it next time you go East or West.

The California Art Glass Works is building a temporary factory at 938 Howard street to replace the company's works destroyed by fire. The new building will be 25x90 feet and is expected to answer all needs until a permanent building can be put up. Mr. Schroeder, the manager, expects to be located at 938 Howard street by June 1. Until then his address is 745 Clayton street. All kinds of repair work and glazing are now being attended to promptly.

The S. F. Weeks Company, 139-141 Berry street, San Francisco, has a large stock of Barrett's Amatite Roofing on hand and more en route. They also have Barrett's Tarred felt—evenly saturated and guaranteed to run clear out to the core at any season of the year. Barrett's materials have been on the market for years and are guaranteed to give satisfaction. The prices are right, and prompt delivery is guaranteed.

Fairbanks, Morse & Co.

Gasolene Electric Lighting Plants, Etc.

Will occupy their temporary building, Howard Street, between First and Second Streets, San Francisco, about June 1, 1906.

A New Building is to be erected for us at once on the site of our old store at 178 First Street.

T. V. Galassi Mosaic Co.

T. V. GALASSI, Pres. & Mgr.

Importers, Manufacturers, Dealers and Contractors

Marble Steps and Wainscot
Terrazzo Steps and Wainscot
Terrazzo and Mosaic Floors
Venetian Mosaic Tile Floors
Marble and Mosaic Mantels
Cement Tile Floors
Roman, Venetian, Glass, Pearl and Ceramic Mosaic Decorations

OFFICE, FACTORY AND DISPLAY ROOMS

1121 Fell Street, near Devisadero,
SAN FRANCISCO, CAL.

W. H. MALOTT, General Manager
Residence 250 Scott Street, S. F.
O. C. JOHNSQN, Secretary

Western Roofing Materials Company

General Roofing Business

Felt and Gravel Roofs, Repairs, Roofing Felts, Asphalt, Etc.

Office and Works, Seventh and Hooper Sts., San Francisco
Phone Mint 4371

Holdtite Cement Plaster

Unequalled in Tensile Strength and Hardness

A GOOD SAND CARRIER

DEALERS WANTED Correspondence Solicited

The Pacific Cement Plaster Co.

430 Chamber of Commerce - - - - - LOS ANGELES, CAL.

T. V. Glassi Company.

The T. V. Glassi Mosaic Co. of 1121 Fell street was not injured in the least by the earthquake and fire. The company is in a position to handle all orders promptly and guarantees satisfaction. With a large factory equipped with modern machinery, a complete stock of material and a staff of skilled artists and workmen, the firm is prepared to do the very best work at lowest prices. A specialty is made of Roman mosaic, terrazzo and tile floors for vestibules and interior of public buildings stores, offices and dwellings. The company is sole manufacturers in the United States of Venetian mosaic tiles and furnishes this work promptly in any design to order at moderate prices in competition with the cost of the other stock tiles. The company is also the Pacific Coast representative for the Assembled Tile and Slab Company of Pitsburg, Pa. Special designs and estimates of cost are furnished for all work on application.

Pioneer Roofer in Business Again.

It will be good news to the many old friends of Richard Flaherty to learn that he is back in the roofing business, having assumed control of the Standard Roofing Company, formerly managed by Harry Larkin and R. H. Flaherty. Mr. Larkin has retired from the company. Everybody in the building line knows Richard Flaherty, who established the Standard Roofing Company 'way back in 1862.

Practically all the big buildings which were destroyed in the recent earthquake and fire were roofed by Mr. Flaherty, and architects and contractors are well acquainted with his work. Mr. Flaherty began as an asphaltum worker when he was little more than a boy. "I was born in the business and I am going to die in it," is his apt way of announcing to the trade his determination to again assume charge of the Standard Roofing Company's affairs. No matter how low it may be necessary for the firm to figure, it will be Mr. Flaherty's aim to maintain the same high standard of work as he was known to supply during the 45 years active service prior to his retirement a few years ago. As soon as the lot can be cleared, Mr. Flaherty will erect a substantial building for his business on McAllister street, near the City Hall.

Home Tel 6052

CLAYTON LEWIS

Consulting Engineer in Mechanics and Electricity

419 Byrne Building Los Angeles, Cal.

**Cement
Structural Steel
Pig Iron
Coke Etc.**

G. W. McNear

Union Savings Bank Bldg.,
OAKLAND, CAL.
Phone Oakland 7334

Clay Street Bulkhead,
SAN FRANCISCO, CAL.

SUNTAN
TRADE MARK

Leather Draperies

Are both durable and novel. You cannot find anything more artistic to beautify your home. ¶ Mention this advertisement and we will send you catalogue of Suntan Leather Draperies and Pillow Covers Free :: :: :: ::

Leather Grill & Drapery Co.

708 S. Spring St.
LOS ANGELES - CALIFORNIA

L. Tozer & Son Co.

DOCORATORS AND DESIGNERS OF BEAUTIFUL INTERIORS
HIGH CLASS WALL PAPERS

Choicest selections of Foreign and Domestic lines. Most complete stock on the Pacific Coast, from the least expensive to the finest grades. Suggestions regarding the decoration of your home cheerfully extended. Send for samples.

PACIFIC COAST AGENTS FOR FABRIKONA BURLAPS

San Francisco, Cal.

C. F. Wieland
Consulting Engineer
Mechanical and Structural Engineering
Designs for Steel Structures a Specialty

Temporary Addresses:
Fell St., San Francisco
Benvenue Ave., Berkeley

What Becomes of the Scrap Metal.

Few people outside of a certain line of business are aware as to what becomes of the vast quantities of scrap metals that are accumulated from day to day. At the present time the question of scrap is a most important factor to almost every one who was unfortunate enough to be in the recent fire. One prominent firm in this line of business, which makes a specialty of buying up quantities of brass, copper, lead, etc., is the Great Western Smelting and Refining Company, located at Spear and Folsom streets, San Francisco. This firm escaped both the fire and earthquake and immediately after the fire resumed operation of their large plant and now utilizes all the waste material, of which there are large quantities in the ruined city. The company employs experienced men, who grade and sort the different metals and use all the scientific principles in utilizing almost everything in the line of scrap metals. Nothing goes to waste. The firm has a number of large furnaces, and the manufactured product is shipped all over the Coast. This firm is backed by large capital and is in a position to pay spot cash for any quantity of material that it buys, which is an essential point at this time, with the banks all closed, and is about the only tangible commodity that one can realize cash on in a hurry.

The company has been in business for a great many years and bears a most enviable reputation. There is a large plant in Chicago and also one in Seattle. Mr. A. Alper is general manager of the San Francisco plant.

The H. W. Johns-Manville Company, with temporary offices at 1301 Golden Gate avenue, corner Fillmore, San Francisco, makes the following announcement:

"For the benefit of those not already informed, we are desirous of bringing before you at this time our Johns-Manville Asbestos Fire Resisting Roofing and Sidings for temporary and permanent buildings. Owing to the great damage to our city by the earthquake and fire, it will be necessary, in order to resume business, to erect temporary buildings in the destroyed section of the city as quickly as possible. For this purpose we have the ideal material, a material the adaptability and utility of which can be quickly seen by an inspection of our goods; in fact, our material is distinctly superior to anything that could be used for the purpose. Being composed of pure asbestos and a special waterproofing compound, our material is therefore purely mineral throughout. It is a well-known fact that asbestos, being a mineral rock, is the greatest fire resistant known. In addition to the fire-resisting qualities of our material, the rapidity and ease with which it can be handled, as compared with sheet or corrugated iron, is a very commendable feature."

Brittain & Company
(Successors to C. H. PHILPOTT CO.)

Yale Locks and
Fine Builders' Hardware

S. E. Cor. Van Ness Ave. and Turk St., San Francisco.

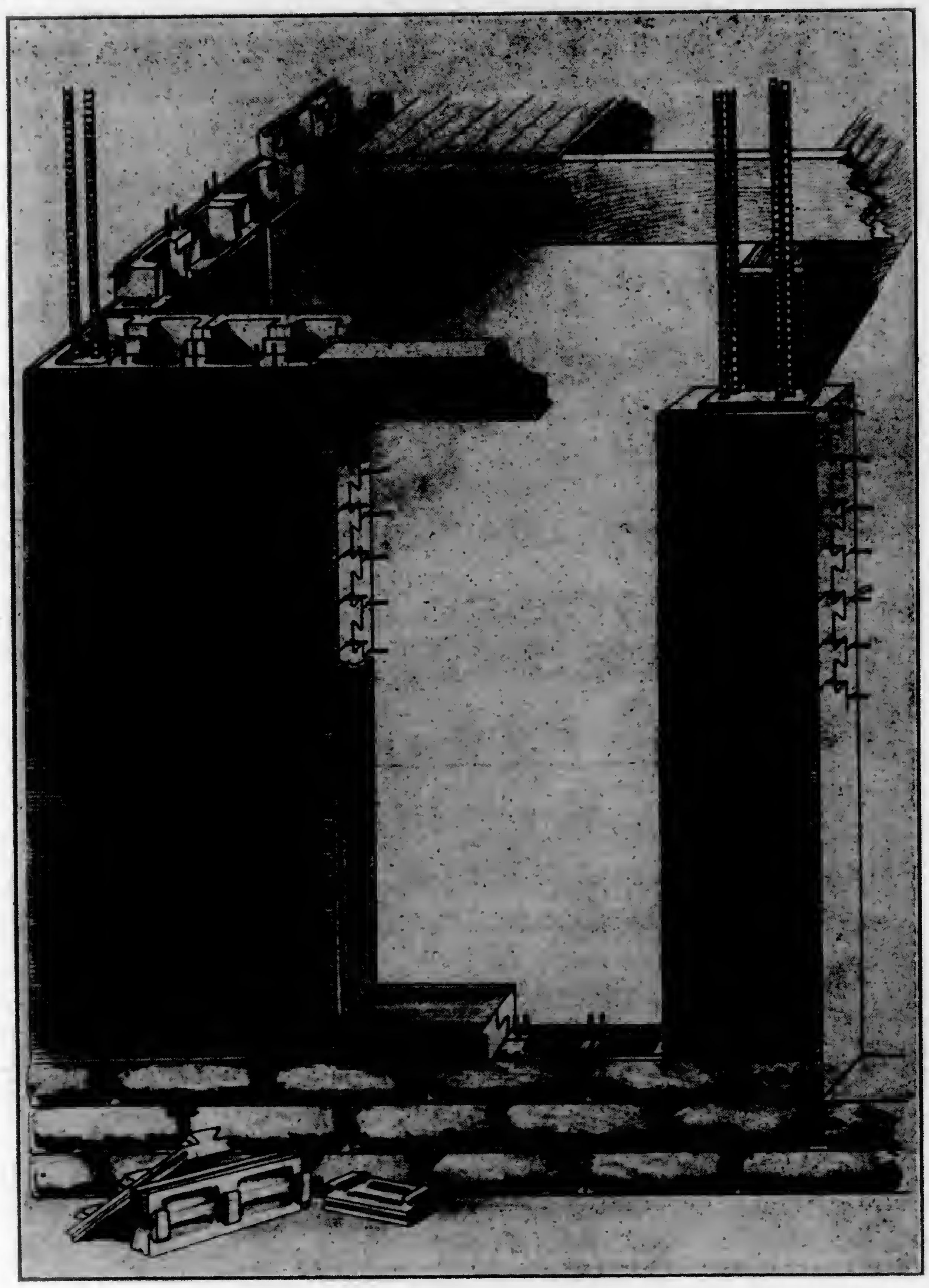
P. W. DREUSIKE O. B. DREUSIKE

San Francisco Cornice Co.
MANUFACTURERS OF
Architectural Sheet Metal Work
Office and Factory, Fourteenth and Florida Streets,
Builders' Exchange Box 337 SAN FRANCISCO, CAL.

Hercules Gasoline Engines
WILL PROVE BEST TO DRIVE
Brick Cleaning Machines, Swing Saws, Saw Tables
Concrete Mixers, Etc.
HERCULES HOISTING ENGINES—Single and double drum, single motion or reversible, 5 h. p. to 250 h. p.
High Speed Multiple Cylinder Dynamo Engines ALL 1906 MODEL
The Hercules Gas Engine Works
Works and Office, Alameda, Cal. Phone Ala. 91. Temporary Salesroom, 90 Second St., S. F.

The Inlaid Floor Company, with temporary offices at 1235 Laguna street, makes this encouraging announcement: "We are fortunate to have saved our factory and stock, and are now running as usual. We already have more than half our force at work. Our stock of ⅞-inch Oak and Maple T. and G. Flooring is very large, and our organization complete. We will do anything that comes along in the rebuilding of San Francisco."

H. S. White Machinery Co.
Wrecking, Appraising and
Installing our Specialties
PLENTY OF BOILER ENGINES,
PUMPS, PIPE, Etc.
METALS
of all kinds bought. Spot cash paid for all material
Yards, Cor. Ninth and Bryant,
San Francisco



The Modern Method

Concrete, Steel and Terra Cotta Walls

Damp, Fire and Water Proof

Interlocking Construction Co.

730 ELEVENTH STREET, OAKLAND

(See description and illustration of this type of construction on another page.)

ABBOTTSFORD
SHINGLE STAINS

MADE BY THE

BAYSIDE MFG. CO.

829-831 East Fourteenth St. E. Oakland

No other Shingle Stains will wear on the Pacific Coast like ABBOTTSFORD SHINGE STAINS They contain Creosote and are Fresh when others Have Faded

SAMPLES ON REQUEST

PHONE MAIN 22

PIERCE HARDWARE CO.

(INCORPORATED)

FINE BUILDERS' HARDWARE

AGENTS YALE & TOWNE MFG. CO.

Sporting Goods, Stoves and Ranges
Gas and Electric Fixtures

1108-1110 Broadway
OAKLAND, CAL.

Gladding, McBean & Co.

Brick and Terra Cotta

Temporary Office
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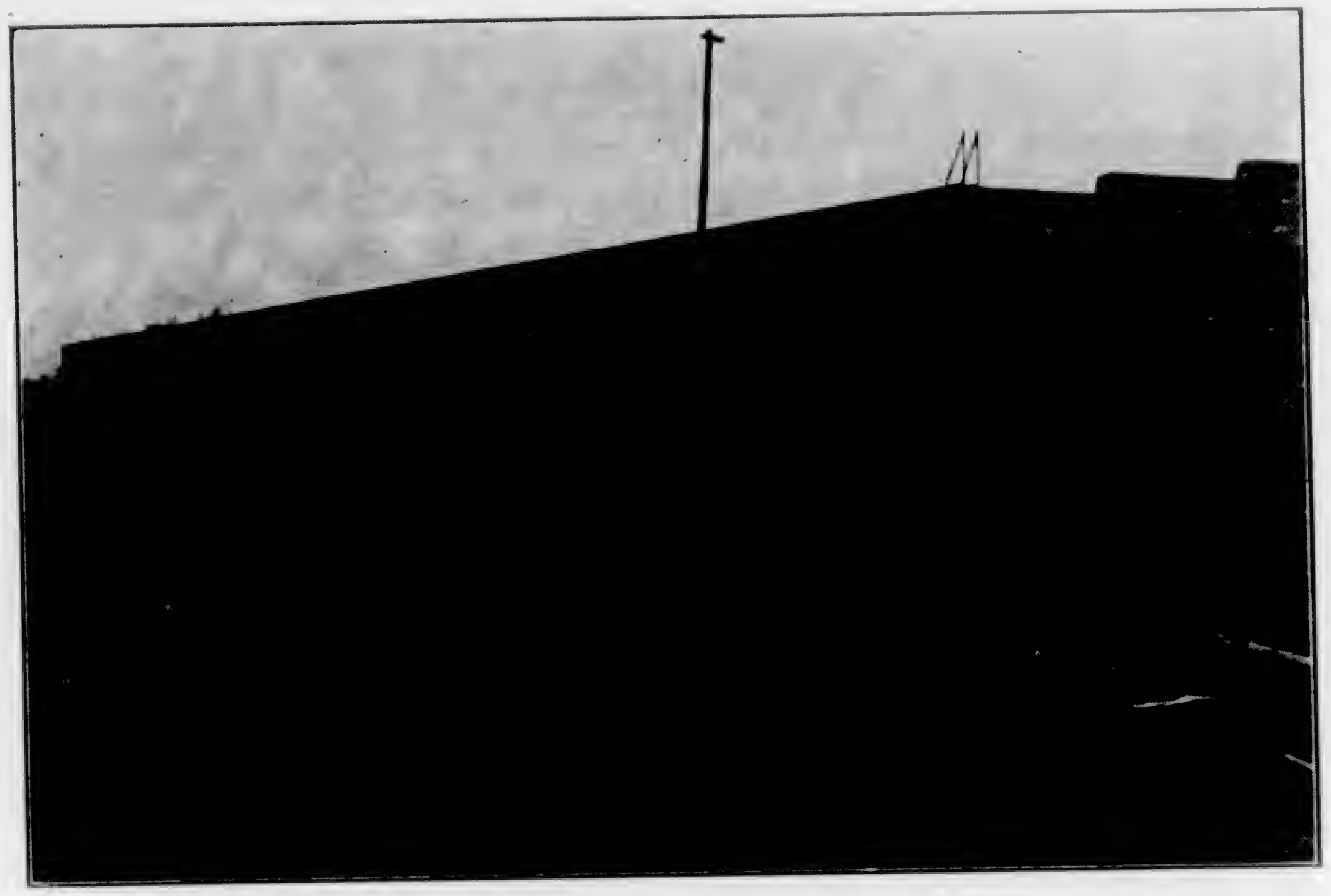

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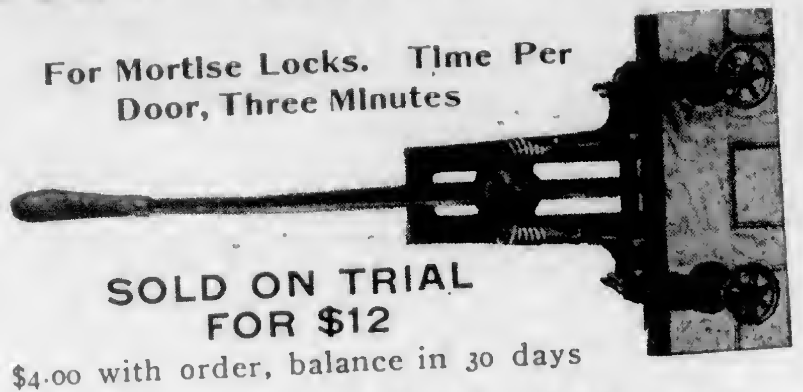

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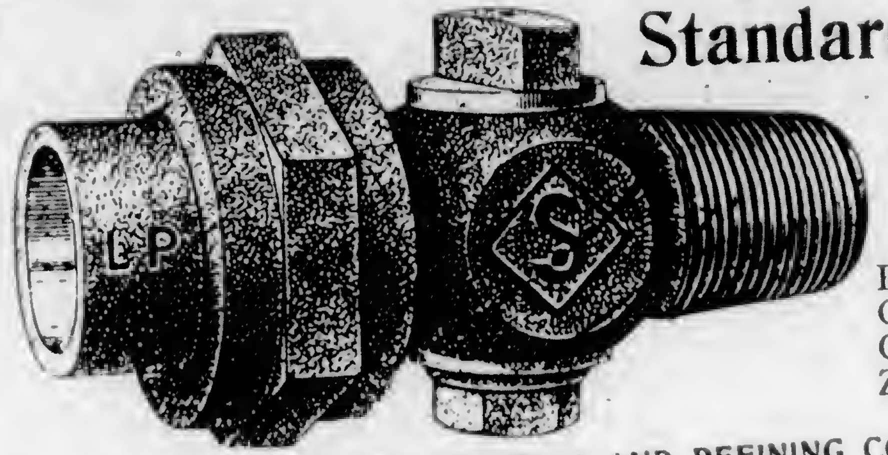

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Contents for June

PAGE

Frontispiece—United States Federal Building at Los Angeles . . . 18
Why Believe in San Francisco's Future . . . *Herbert E. Law* 19
Glass Houses for San Francisco . . . . . *Theodore H. Skinner, Architect* 22
Will be Many Skyscrapers 24
American Architecture as Viewed by an English Architect . . . *Archibald C. Hope, Architect* 25
Too Many Temporary Buildings . . . . . *T. Patterson Ross, Architect* 27
Who is to Blame for San Francisco's Plight . . *Chas. Peter Weeks, Architect* 28
The New Claremont Hotel . . . . *Charles W. Dickey, Architect* 31
Earthquakes and Earthquake Proof Buildings . . . . . . *William F. Scott* 33

TERRA COTTA AND BRICK—
Notes on the San Francisco Fire . . . . *E. W. Fitzpatrick* 35
Executive Officer of the International Society Building Commissioners
Reinforced Brick Work . . . . *Robert W. Gardner* 43
Bright Outlook for Terra Cotta . . . . *W. E. Dennison* 44
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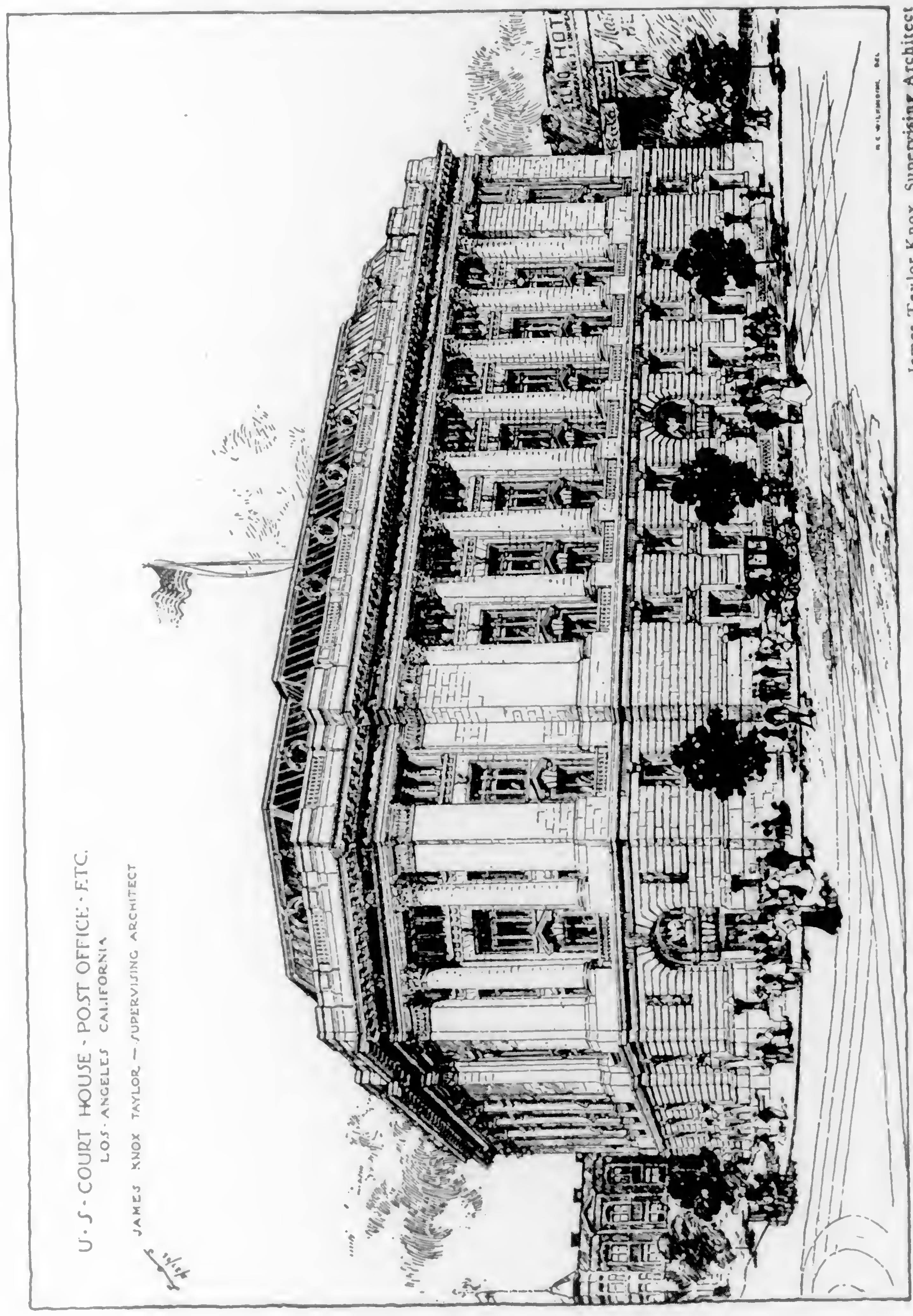
CEMENT AND CONCRETE—
Reinforced Concrete Frame Construction . . . . *John B. Leonard, C. E.* 45
Strong Argument for Concrete 49
Structural Association Discusses Reinforced Concrete . *F. W. Jones* 49
Some Fresno County Architecture 52
Bright Outlook for the San Francisco Architectural Club . . *C.E.Roesch* 56
Inspiring Words from Baltimore 60

LANDSCAPE ARCHITECTURE—
The West Oakland Playground . . . . *Wilbur David Cook, Jr., Landscape Architect* 61
San Francisco—the City Beautiful . . *Daniel H. Burnham* 65

HEATING, LIGHTING AND ELECTRICAL WORK—
Electricity Not a Factor in Recent Conflagration . . . *Geo. J. Wellington, C. E.* 66
Brickmaker's Opposition to Reinforced Concrete 68
Among the Architects 70

EDITORIAL—
Stop the Shack Building . . . . *A. W. Smith, Architect* 74
Give Us Class A Buildings . . . . *F. W. J.* 75

PUBLISHER'S CORNER—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THE
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Vol. V. JUNE, 1906. No. 2.

Why Believe in San Francisco's Future*

By HERBERT E. LAW

CONFIDENCE must have a secure basis. Architecturally one cannot hang a stately dome to a star by a silken thread, or rest a modern, class "A" building on fancifully colored, inflated paper bags. A philosophical conclusion demands adequate premises. No historical development is the outgrowth of a moment, but has a sufficient cause. It is equally impossible for confidence in San Francisco's future to be invincible, unless it rests upon a solid foundation of fact. What, then, are some of the elements which come to us who face the conditions as they are with unfilmed eye—which enter into the supreme and steady confidence in what appears to be the inevitable outcome of recent events in this home city of ours?

Among them are, first, San Francisco's geographical situation. Its greatness is inevitable and its future secure, not merely by reason of the few decades of human effort and achievement which the peninsula has witnessed. These were assured aeons ago by the operation of great natural laws which carved out of solid masonry the Golden Gate and dug this bay with a carrying capacity sufficient to float the fleets of the world.

Second, strategically San Francisco could not be ignored, or neglected, if the nation desired to do so. Related as it is to the defense of this long reach of the Pacific Coast and to our island possessions in the Pacific, it makes demands upon the attention of the government which in themselves would be sufficient to insure an important city on the slopes of these hills. Were the present dwellers in San Francisco to desert it in a body, it would be rebuilt and inhabited by those whom the government's activities would bring here, and because of its immense importance strategically it has a grip upon the future which nothing can break.

Our confidence is based, third, upon the brief history of this city's life. It was founded by the Pioneers. They were strong men who faced stern conditions with a resolution which nothing could shake. When they found it, it was a stretch of sand dunes, an apparently uninhabited waste. There are still some of them enjoying an honored old age among us, who have seen it develop until it became one of the most active, aggressive and prosperous cities on the American continent, and who have witnessed the gradual transformation from the Pioneer conditions and architecture to modern activities and buildings on every hand. They have left their impress upon the city. They have passed on their loyalty and affection for it as a priceless heritage, and those who take up the work today breathe intense loyalty in the very atmosphere and have caught some of the stern determination and resolution of those who first looked upon this location and labored in its development.

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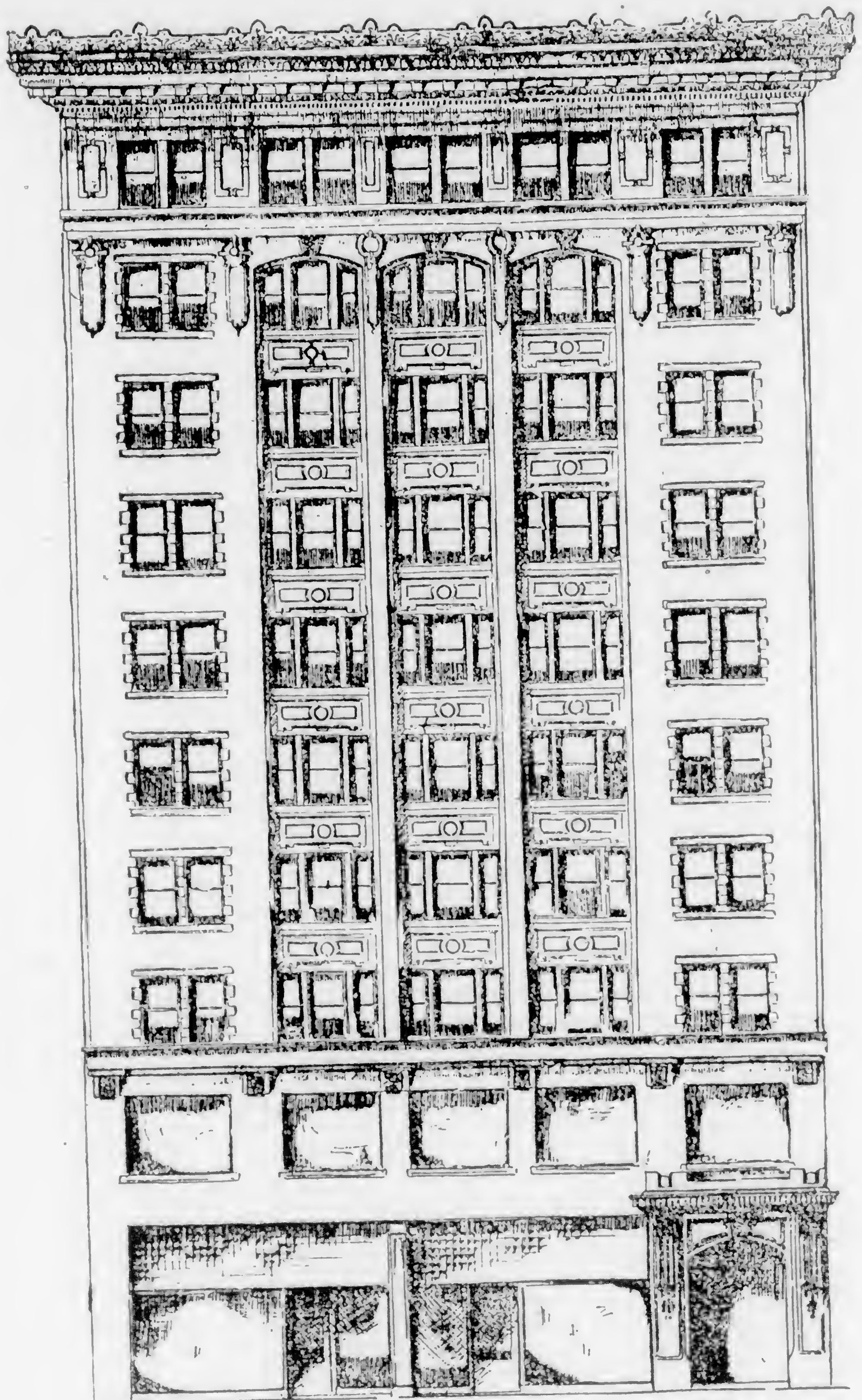
*In a personal letter to the publisher of the Architect and Engineer, Mr. Law, who, by the way, is recognized as one of San Francisco's most progressive and successful business men, writes as follows: "I am very glad to do anything which will make clear the steady. sturdy, rational confidence of those vitally interested in San Francisco, and congratulate you cordially upon your enterprise in being the first among California magazines to publish after the disaster, and with every good wish for the spread of the facts which you are able to give as to present conditions and future progress."

Fourth, we believe in the city commercially. A mere cursory glance at the bank clearings, at the wholesale and retail business showing of this city for the last ten years will make clear to the most unobservant the tremendous development which has been in progress. This means volumes to those who are vitally interested in this matter. It is not the record of achievement that interests us, but the element of prophecy in it, for the tremendous strides in the city commercially are weighty suggestions of what is inevitable by reason of its location, and because of the opportunities that are opening to it increasingly in the Orient. The Pacific will be a highway of commerce, a scene of the most dramatic develepements in the world's history. Some of the richest and most populous lands on the globe lie just beyond us, and through our gateway there will flow in and out the currents of commerce which will rise with the progress of time until what seems to us so mighty a stream today will be like a mountain rivulet in comparison with the majestic sweep of the Mississippi.

But above all else, we believe in the future of San Francisco with confidence because of the spirit of our people. Calamity is not an unmixed curse. It is never desired, and its losses are not anticipated with any eager expectation, but it does have in it some elements of recompense. To one who has been intimately associated with those who have been struggling with the problems of the city during the recent days, there has come a realization of the depth and sincerity of the devotion of our people to the city and its interests, which is a solid source of satisfaction and an adequate basis for rational hope. They have shown a courage, resourcefulness, energy, optimism and unity which even the stern conditions which they faced and fully realized cannot defeat. There is a cheerfulness and a buoyancy which are not irrational nor are they at all due to the mere hysterical excitement of the moment. They are the expression of the same splendid spirit which conquered the plains and crested the mountains in pioneer days. They are the exemplification of Western grit and determination. They are characteristically American, and the present calamity is simply the tool by which a greater future than we have ever known can be carved. Someone has said that "men are more important than broad acres or luxury or gold mines." In Walt Whitman's phrase, "Produce great persons—the rest follows." In a similar line somebody looking upon the sterile country about Plymouth Rock said to one of the dwellers there, "What do you raise on this rocky soil?" to which the reply was "We raise men."

We have every reason to be steadfast, quiet and confident as we see that sturdy spirit of determination which seizes upon disaster with ungloved hand and molds it into opportunity, which discards its coat and lays aside society's conventions and goes at existing conditions without fear or fretting.

There are some in this city who may not recover. This possibility is inevitable, although it is one of the pitiable results of such a disaster. On the other hand, the city today offers larger opportunities for harder work and greater achievements than ever before since its foundation, and out



Design for the New History Building, San Francisco Cunningham & Politeo, Architects of the stress and strain of present conditions, as a result of the earnest and united effort, there will develop the most modern and splendid city on the American Continent, a fitting monument to those who founded this city on the sand dunes by the sunset sea, and to those, who, when calamity sweeps upon it suddenly have no greater joy than to spend cheerfully their time, effort, thought and money for its re-creation on new and nobler lines.

Glass Houses For San Francisco

By THEODORE H. SKINNER, Architect

(A new type of architecture will soon be seen in San Francisco as a result of the recent fire. A syndicate of New York restaurant men is planning to erect what will be known as "The Glass House." No site has yet been chosen for the building, as the representative of the syndicate, who is now in San Francisco, does not believe it would be expedient to select a location until some definite idea may be formed of the drift of the throng.

"The Glass House" promises to be the most elaborate as well as the most unique structure yet seen on the coast, or in fact in any other city of the country. The architects claim they can put up a glass building that will be absolutely fireproof. Certainly the erection of this unique building will be watched with unusual interest. The plans have been drawn by Putnam and Cox, Rand and Skinner, the well-known Boston firm of architects, who are now in San Francisco.) Ed.

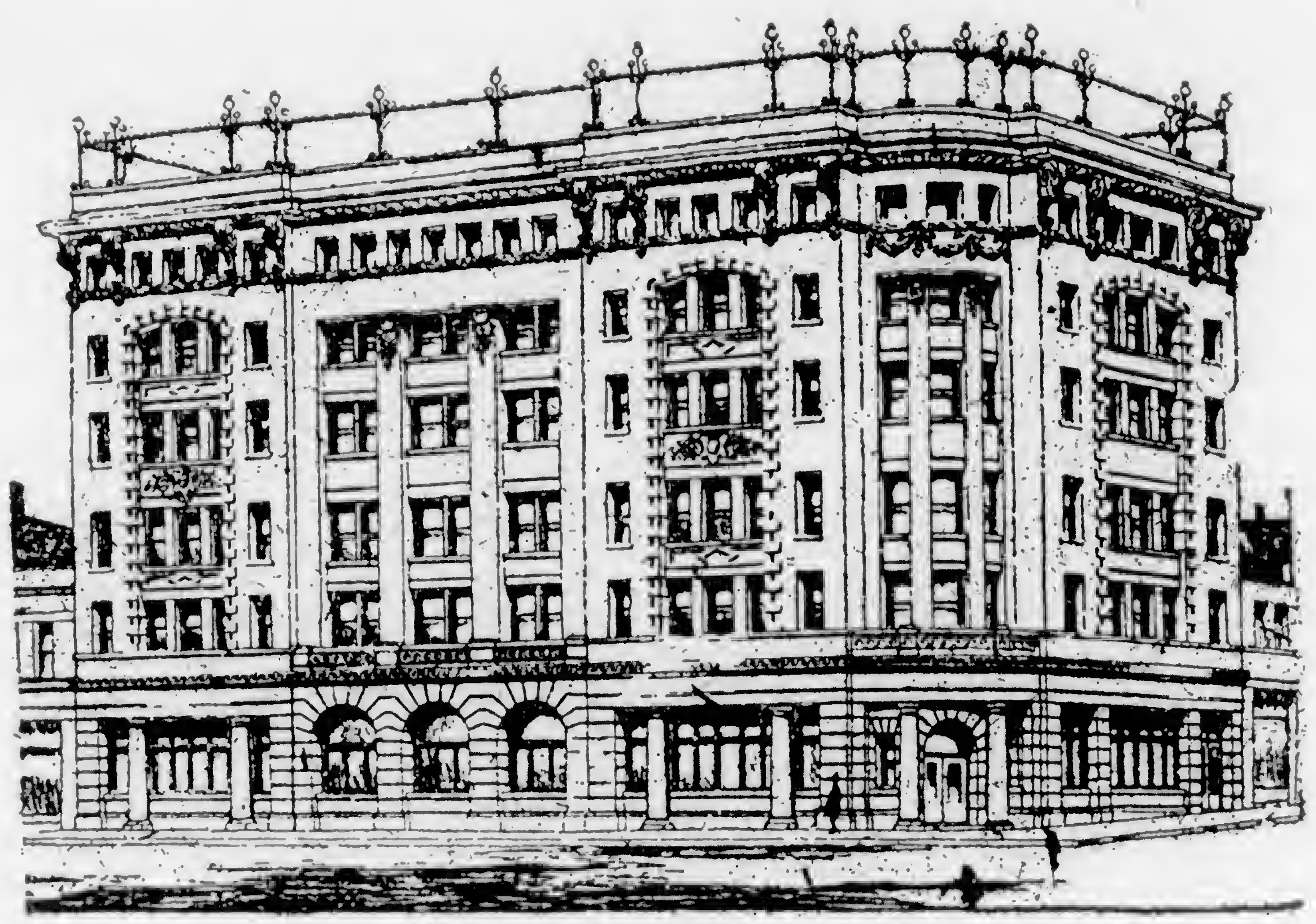
THE complete destruction of the many "fireproof" building materials in the recent conflagration should lead in the future to a more careful examination of the fire-resistant qualities of other building materials before they are accepted by architects and builders as being fireproof. One of these materials is glass.

We have been too prone to accept the so-called tests conducted by interested contractors or manufacturers as a proof of the results we wish to obtain. We have all too readily embodied in our practice materials which have not made good their titles in the supreme tests of Baltimore and San Francisco.

About 1900 the late Edward Atkinson established an insurance experiment station at Boston where materials could be tested. Its laboratory work and its reports have been of great value, and should be more widely known. The station's report on the Baltimore fire, reread at this time, would apply line for line to San Francisco, and it should be in the hands of all who are interested in the rebuilding of the city.

Two facts of vital moment at this time stand discoverable both in the report and in the ruined city, viz., that reinforced concrete and reinforced glass did the work they were intended to do. Although seared and scarred, they were in position when the fire subsided.

Leaving aside the discussion of concrete and its merits and faults, let us see if there is not a larger field than generally imagined possible for the use of reinforced glass, or, commonly speaking, wire-glass, which will enter largely into the construction of the restaurant projected for San Francisco. As a fireproofing or fire-resistant material, we find that in metal frames wire glass has stood the severest assaults of the flames, as, in a few cases observable, fire entered buildings at unguarded openings and, the interiors becoming ignited, the wire-glass was subjected to fire on both sides at once. Even then it did not utterly fail, and stuck to its frames as long as the latter lasted.



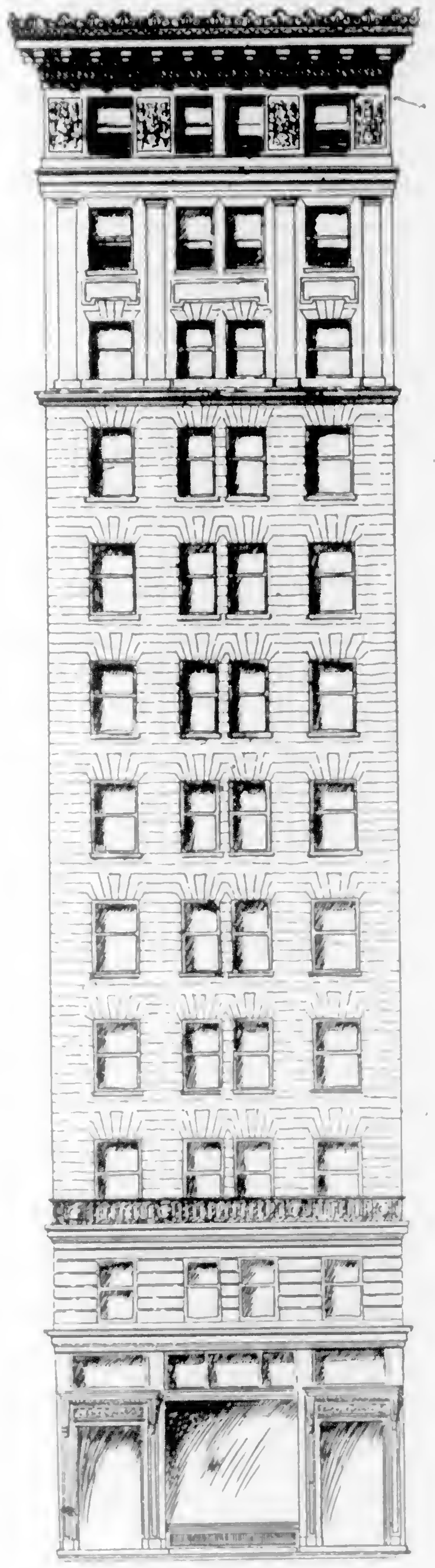
Office Building and Roof Garden for Mr. Frank H. Burke, San Francisco G. A. Dodge, Architect

Why this material has this high heat resistance we need not discuss now. Suffice it that it has, and that it is proof against destruction even under extraordinary circumstances. May we not, then, enlarge its application with advantage? May we not substitute double sheets of it for our curtain walls in steel-frame buildings with an air space between? We can go even further than this, entirely encasing our building with sheets of it held to the protected frame by invisible clips. By this method of construction we can do away entirely with windows as openings for light and have translucent walls everywhere, with clear panels arranged for vision. On such a case of glass the elements would have no effect. Acid smoke would not eat it out; soot would not cling to it and disfigure it, and disintegration would not mar the beauty of its form.

As such a casing would be much lighter in weight than masonry, lighter steel framing and economy would follow. Perhaps greater scope might be given to the fancy of the design, and a new architecture be possible. There would be no greater expense incurred than in other types of architecture. Rich ornaments could be cast or moulded while the glass was in viscous state; color could be introduced in unlimited extent, and the beautiful city of Revelation would become a reality on earth, with its shining walls, towers and spires that would glisten in the sunlight and rival the gems of a jeweled crown.

Annealed glass bricks and slabs with higher crushing limit than stone are already in use abroad, and buildings largely of glass are beautiful realities in Brussels, Berlin, Nuremburg and Turin. That we are about to enter upon an era where glass plays an important part may be well believed.

Will be Many Skyscrapers



Twelve Story Office Building for E. W. Hopkins, Pine Street, San Francisco
Bliss & Faville, Architects

IT is inspiring to note the confidence festing in the future of San Francisco which big property owners are mani- by ordering immediate preparation of plans for new buildings. The desire of the owner will permit. While he is trying to get a rea- is clearly to rebuild as quickly as conditions sonable settlement of his insurance, he is having plans made for the reconstruction of his burned property, so that when the insurance people tell him to go ahead and clear away the debris he will be ready to build without further delay.

It is not at all probable that the business center will be materially changed. Market street will continue to be the Broadway of San Francisco and from this great thoroughfare will radiate, as formerly, the various business houses, commercial, financial, wholesale and retail.

The skyscraper will be even more prominent in the new San Francisco than it was in the old city. Plans now in architects' offices call for scores of office buildings of Class A construction, varying from eight to eighteen stories. A few of these are pictured in this number of the Architect and Engineer. The twelve-story building shown on this page is to be erected by E. W. Hopkins at Pine and Leidesdorff streets at a cost of $200,000. It will have stone facings and metal frames.

The fact that more rapid progress is not being made on some of the big skyscrapers that were under construction before the fire and which were damaged very little, has been the cause of comment. Among these buildings are the Whittell and Butler structures near Union Square. The steelwork of both is intact, and if construction was rushed they could be made ready for occupancy long before some of the new buildings can be put up.

* * *

Every man should think for himself
But not of himself alone,
For others have some right to pelf
As well as wrongs to atone.

American Architecture as Viewed by An English Architect

By ARCHIBALD C. HOPE, Architect

YOU ask me for my impressions of American architecture from an English architect's standpoint. Sir, to express all I think would, perhaps, fill a ten-volume novel, but as your space is valuable I will endeavor to put in a few words—my *first* impressions.

In New York everything seemed *big* and gaudy—from flat irons downward—even the underground railway, with its four tracks was *big*.

In Chicago the buildings are not only *big*, but monstrous—one gets a creek in the back of the neck looking up at the sky scrapers and trying to comprehend the fine detail around the twentieth story. The chief item an architect notices up there is the immense cornice—intended, of course, to be in proportion to the height, with the result that there was not much chance of seeing anything above the same.

This, I assumed, was the chief reason why so few attempts had been made to break the sky line (as seen from the street grade), as with the exception of one or two very early scrapers was the case.

Some attempts have been made to obviate this mistake by placing the main Eaves cornice two-thirds up the building and making a tall "attic" story above—still, however, keeping the straight sky line—thus falling from grace again.

One just completed by Messrs. Burnham & Co. has attempted a feature in a pent house on top of a flat roof.

This, when viewed from a sufficient distance, is a relief to the monotony.

But it remained for me to reach the far west city of San Francisco before finding really neat—well considered—classical detail. Here I find details considered from the point of view they are to be seen from, and where they *can* be seen in addition to up aloft.

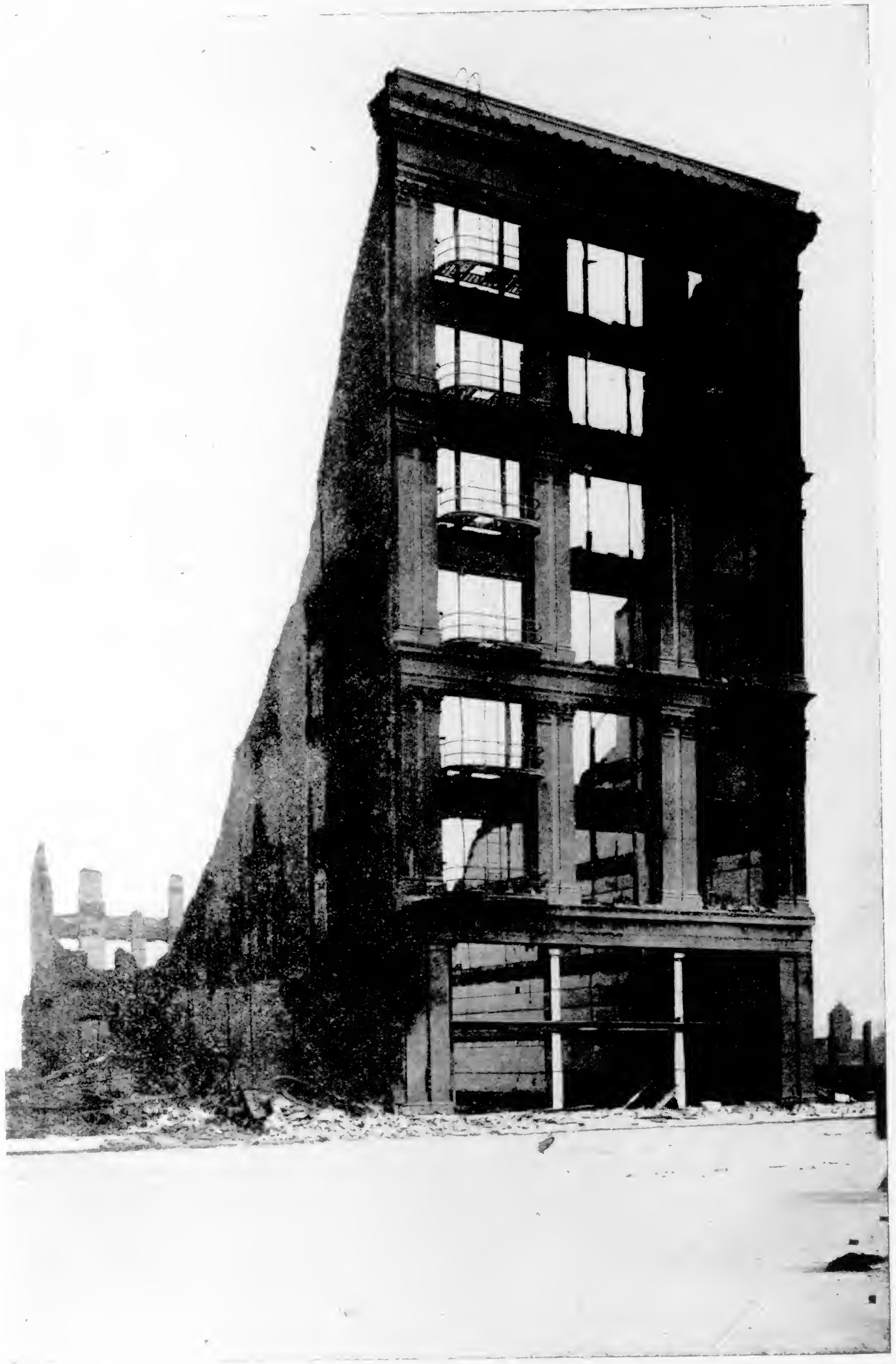
It is my regret not to have seen San Francisco in its full beauty before the calamity of April 18th last.

Even now what an artistic treat it is for an artist to wander through the villa residence district—shutting out, of course, the street kitchens and office placards—admiring what is still intact and restoring many ruined edifices, from the tiny pieces left, to build ones imagination on.

As to my sentiments or opinions on scrapers and the necessary steel construction, an Englishman has nothing at home with which to make comparisons—unless it be the large flour mills and bonding warehouses at the sea coast ports, which are fast being converted into reinforced concrete buildings some four or five stories high and often continued ten or fifteen feet out over the water side from the first floor level.

These are built on R. I. C. piles and R. I. C. wharves, and are standing the best of knocking about and sea worms much better than either wood or sandstone or concrete blocks.

This is the nearest approach to a building material of a monolethic nature to be at all comparable with your steel constructed buildings—but as I have only seen it over here as applied to floor loads—not piers—the comparison is only imaginative.



The Bare Building in Market Street. This Structure Was Unharmed by the Earthquake Wright and Polk, Architects

Too Many Temporary Buildings

By T. PATTERSON ROSS, Architect

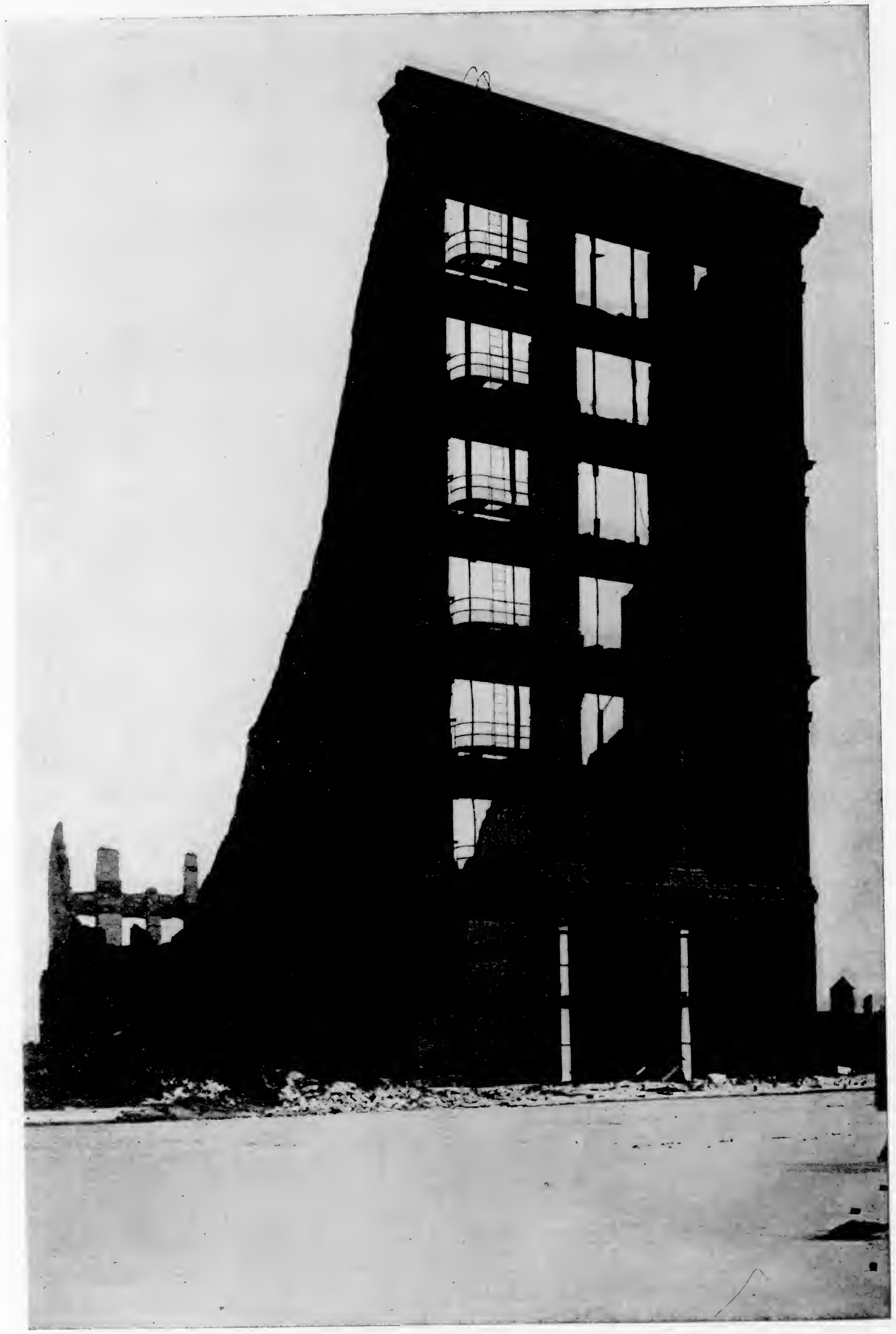
IT IS unfortunate that the city authorities should have permitted the construction of so many shacks in the business section of the burned district of San Francisco. I fear this seeming oversight on the part of those in power will act as a check to the erection of permanent buildings to a far greater extent than we now realize. Architects should discourage as far as possible the construction of temporary buildings. Once property owners get into the way of building cheap structures it is difficult to interest them in more substantial buildings. One reason for this is that the temporary structure commands a very fair return on the investment—a condition that at once appeals to the man who wants quick returns. The temporary building can be put up quickly and the owner has little difficulty in finding a tenant who will lease for a term of two or three years. It is my opinion that the authorities should discourage this type of buildings except in certain districts and the time the structure is allowed to remain up should be limited to such a short period that the property owner would prefer to build permanently even though by doing so he would be losing immediate income.

I understand that some owners who have put up temporary buildings have made five-year leases with their tenants, and I am afraid the authorities will have hard work compelling these owners to cancel the leases, tear down the temporary structures and erect permanent buildings inside of the five years. The building of these temporary shacks not only hinders the erection of permanent buildings, but it disfigures the business section and makes an eye sore almost as disheartening as the ruins out of which these flimsy affairs have sprung. There is, of course, no architectural beauty about them and the only possible excuse for their existence is that they provide a temporary means of carrying along business that otherwise would have to be abandoned.

It should not be necessary, however, to build shacks on the sites of former Class A, B and C buildings. Business sites should be held in reserve for permanent buildings only, and the man whose business was once carried on in these localities should be willing to shift to some other section where temporary structures are less obnoxious, until a permanent building has replaced the one destroyed. I think temporary buildings should be kept west of Powell street.

Some property owners declare that it would be a waste of time and prevent the city's growth if everybody in the business section waited until their insurance is adjusted and the debris cleaned so as to put up permanent buildings. That may be so, but is it not better to waste time now, if we must call it time wasted, rather than six months or a year or two years hence, for sooner or later the temporary shack will have to come down and be replaced with something substantial?

There will probably be few important changes in the style of architecture in the new San Francisco. There may be less of the heavy stone and terra cotta cornices, galvanized iron being substituted. More attention will be paid to the strength of a building rather than the appearance. There will probably be more reinforced concrete construction, and it is safe to say that where bricks are used greater care will be exercised in the workmanship and in the kind of cement used.



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Who Is to Blame for San Francisco's Plight

By CHARLES PETER WEEKS, Architect

BURNING purifies—burning was once a punishment for crime. Today it is not the same crime nor the same burning, but a burning for crime just the same. The olden crime was against religion. Today's crime is against economics.

Two hundred million dollars have been tossed into the air in the San Francisco fire. Let us find out the criminals.

To an extent ignorance wears the guilty stripes but short-sighted greed, carelessness and weakness are the real criminals.

The owner is primarily to blame for loss in the San Francisco fire and rightly suffers for his own crime. But the city, too, is to blame for absolute lack of complete inspection of building plans and buildings, weak building laws and affording no protection to the careful owner against his reckless neighbor. The architect is to blame in being too willing to acquiesce in the owner's desire to build cheaply in fear of losing a commission.

The contractor is to blame for not giving golden workmanship for golden recompense.

This school of experience to which we have all paid a large tuition should teach us all in future to stop these crimes and avoid their results.

By what right do you endanger my office building by erecting your wooden shack alongside? Is there not room enough for such houses outside of the business district?

Why are not specifications read and buildings inspected by the authorities so that inferior workmanship cannot exist? Why is the owner penny wise and pound foolish?

Why is the architect not a big enough man to refuse to build cheap and to see that he builds strong?

In New York the money lenders employ architects to inspect plans and specifications and buildings to see that their interests are protected. San Francisco would do well to adopt this custom.

When a city is down and out, the thing to do is to bring it to life. If pine and galvanized iron will do it let us use them. But care must be exercised that the same old greed does not mislead us.

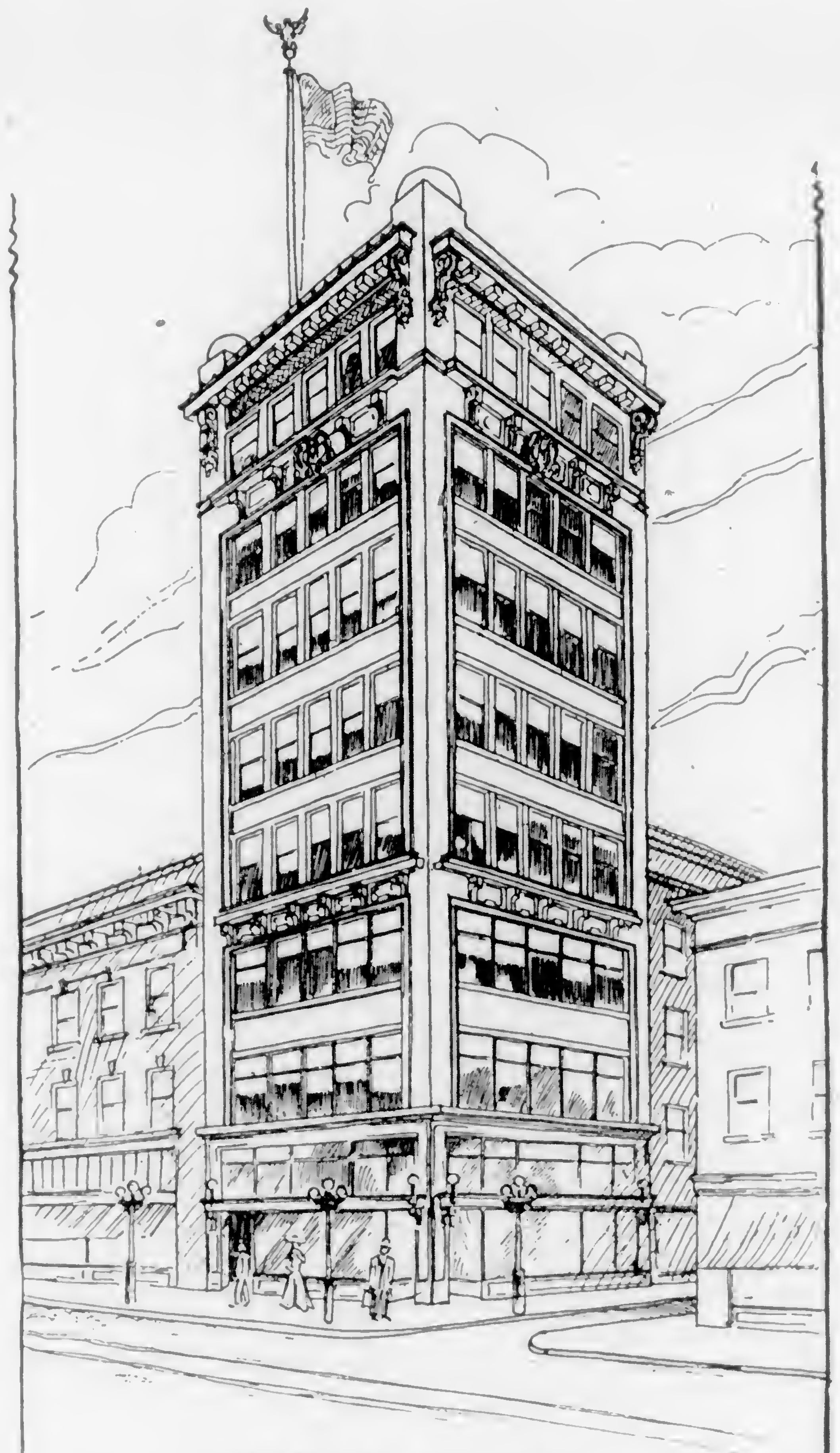
It is not necessary to give a warning note to all for many are planning to rebuild a class "A" city. Many men who, before the fire, would have been contented with wood are now planning for fireproof structures. Reinforced concrete is the joyous cry of the hour, echoing the death knell of hollow tile.

There is undoubtedly a tendency to blindly fly to reinforced concrete, knowing by experience that all other materials failed. Reinforced concrete was not subjected in our late fire to the same test as other materials.

If a brick wall cannot be honestly built, how much less is a reinforced concrete building liable to be well built?

Reinforced concrete buildings in other parts of the country have not all been successful. The best built buildings are the best, in reinforced concrete as well as other material. Therefore, it will be well for the owner to be careful in the selection of his designer.

This material in combination with good brick will undoubtedly form a great part of San Francisco's future big buildings.

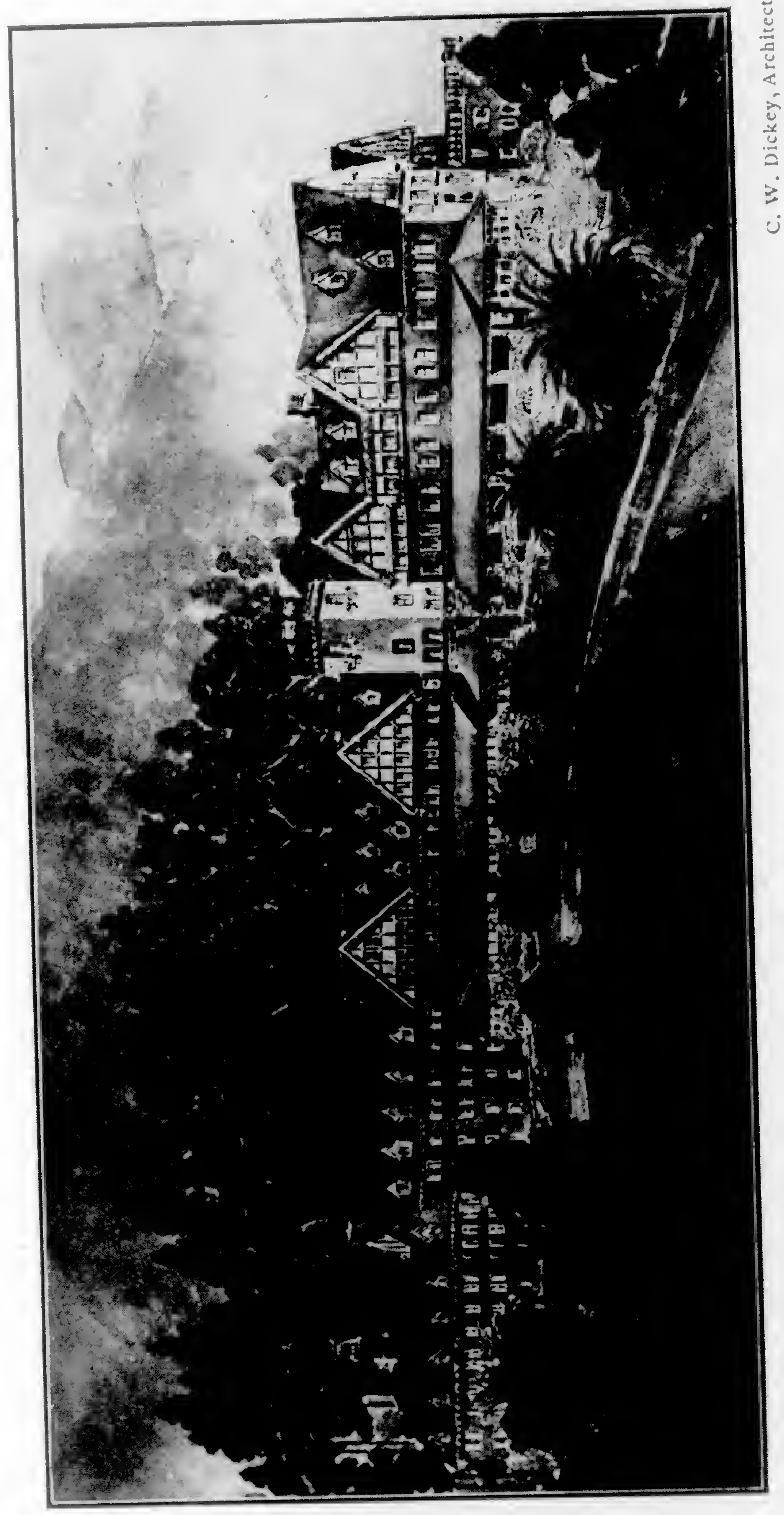


.MARSTON BUILDING.
N E COR KEARNY & HARDIE PLACE bet SUTTER & BUSH ST
MEYER & OBRIEN - ARCHITECTS

The elimination of stone and the restriction of projecting cornices will modify the style of future buildings and have a tendency to produce

A Gothic style is more in harmony with the structural form of a steel a logically artistic facade in the hands of well trained designers. building than the classic style and will be followed and adopted more and more in the future.

The man who makes it a practice to look on the bright side of life not only has an equal chance with the other fellow of getting a fair share of this world's goods, but he has a much better time while he is at it.—Exchange.



C. W. Dickey, Architect

Accepted Design for New Tourist Hotel at Claremont Park, Berkeley

The New Claremont Hotel

By C. W. DICKEY, Architect

AS FAR as site is concerned, the new Claremont Hotel has the advantage of any similar building in California if not in the United States. The grounds themselves are surpassingly beautiful with a garden of fourteen acres that has been lovingly cultivated for a period of forty years. A wild overgrown creek, huge old pines and oaks, and numberless rare trees, shrubs, and flowers combine with the broad lawns to present a most perfect setting for the new building.

The location is also very accessible. It can be reached in five minutes from Berkeley, fifteen minutes from Oakland, and, when the new branch of the Key Route is extended to the grounds, it can be reached from San Francisco in thirty-five minutes. The field from which it can draw for its patronage is thus a large one, exclusive of tourist trade.

The hotel building has been designed to specially fit the location. It is in the rambling Elizabethan style, winding in and out with the contour of the hill, with stone terraces and porches and walls of broad cedar shingles and rough plaster. It will be set back on the side hill at sufficient elevation to get a view of the full sweep of the bay and Oakland over the tops of the trees. The extreme dimensions of the building will be 152 feet by 676 feet, and it will be four stories in height, containing 210 guest rooms, all of which will be bright and sunny and every second one of which will have a bath. The observation tower will be 140 feet in height, overlooking the surrounding country.

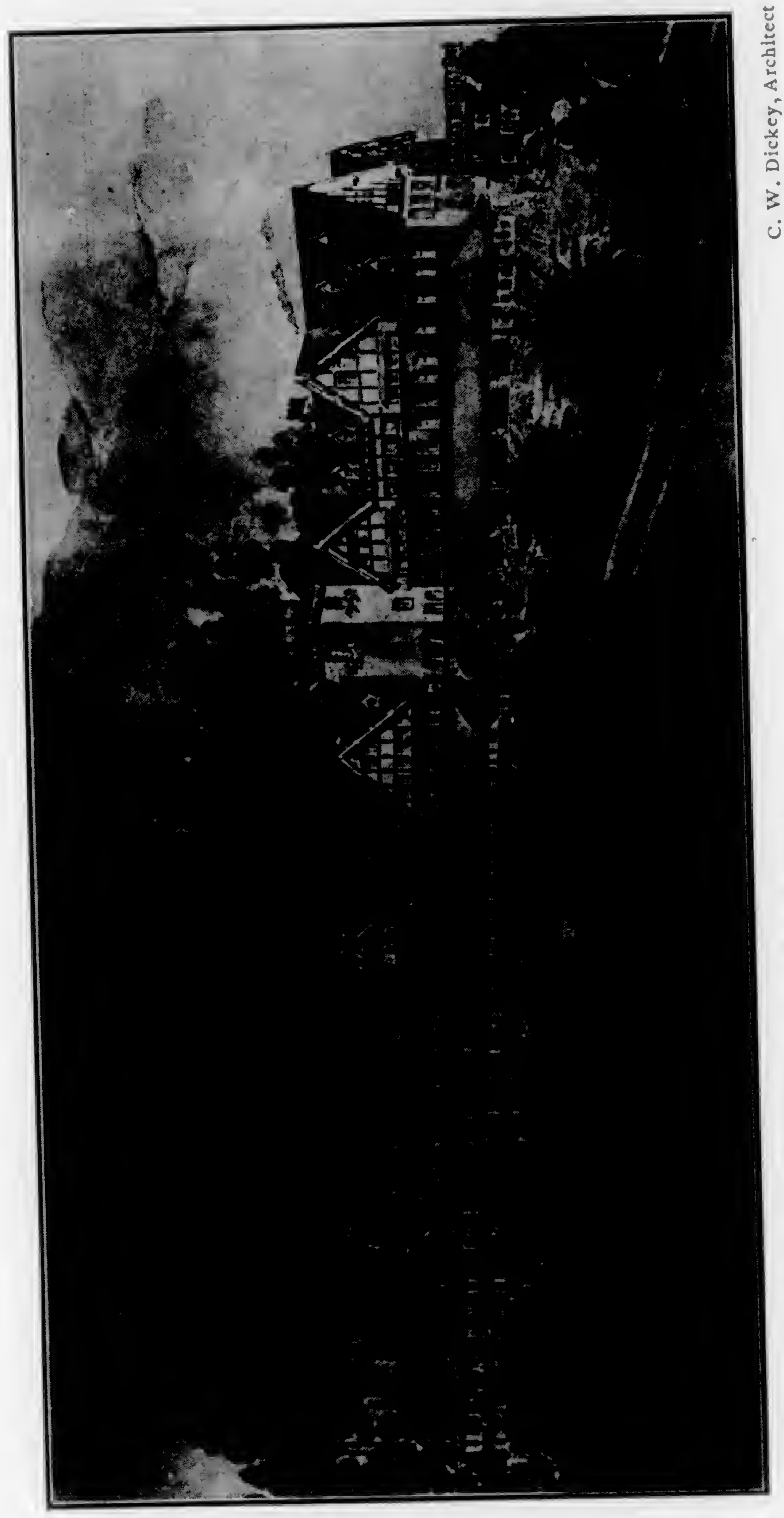
There will be three approaches to the building: Foot passengers will enter the grounds from the Key Route Station through a covered portico leading to an underground tunnel, which will be brilliantly lighted and treated as a grotto with delightful surprises and lighting effects. One can reach the hotel elevators without climbing any stairs and thence be quickly lifted to any floor he may wish to reach. Carriages will enter by the present driveway, which will be extended to enter a broad porte-cochere at the base of the tower. Automobiles will have a special entrance from the tunnel road leading to a porte-cochere directly adjoining the lobby. A commodious garage will be provided to the south and a stable to the north of the building for the accommodation of the two classes of vehicles.

The general arrangement of the floor plan of the hotel is as follows: A large dining-room is placed near the center, facing directly west, with a frontage of 142 feet, overlooking the bay and an equal frontage overlooking a sunken garden in the rear. To the south of this dining-room occurs the lobby and palm room, 58 feet by 153 feet, facing the front garden and also the tunnel road, with a hall and banquet room back of same and guest rooms beyond. To the north of the dining-room are located the culinary department and servants quarters.

The whole interior will be carried out in the English style, both in decorations and furnishings.

A maximum amount of public space and a maximum number of rooms are arranged to overlook the bay and the hotel grounds. There will be a promenade porch on the front of the building 542 feet long, from which guests may obtain a panoramic view of the surrounding country.

The hotel is to be equipped with every modern convenience to be found in similar buildings in other parts of the world. It will be strictly first-class in every way.



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AS FAR as site is concerned, the new Claremont Hotel has the advantage of any similar building in California if not in the United States. The grounds themselves are surpassingly beautiful with a garden of fourteen acres that has been lovingly cultivated for a period of forty years. A wild overgrown creek, huge old pines and oaks, and numberless rare trees, shrubs, and flowers combine with the broad lawns to present a most perfect setting for the new building.

The location is also very accessible. It can be reached in five minutes from Berkeley, fifteen minutes from Oakland, and, when the new branch of the Key Route is extended to the grounds, it can be reached from San Francisco in thirty-five minutes. The field from which it can draw for its patronage is thus a large one, exclusive of tourist trade.

The hotel building has been designed to specially fit the location. It is in the rambling Elizabethan style, winding in and out with the contour of the hill, with stone terraces and porches and walls of broad cedar shingles and rough plaster. It will be set back on the side hill at sufficient elevation to get a view of the full sweep of the bay and Oakland over the tops of the trees. The extreme dimensions of the building will be 152 feet by 676 feet, and it will be four stories in height, containing 210 guest rooms, all of which will be bright and sunny and every second one of which will have a bath. The observation tower will be 140 feet in height, overlooking the surrounding country.

There will be three approaches to the building: Foot passengers will enter the grounds from the Key Route Station through a covered portico leading to an underground tunnel, which will be brilliantly lighted and treated as a grotto with delightful surprises and lighting effects. One can reach the hotel elevators without climbing any stairs and thence be quickly lifted to any floor he may wish to reach. Carriages will enter by the present driveway, which will be extended to enter a broad porte-cochere at the base of the tower. Automobiles will have a special entrance from the tunnel road leading to a porte-cochere directly adjoining the lobby. A commodious garage will be provided to the south and a stable to the north of the building for the accommodation of the two classes of vehicles.

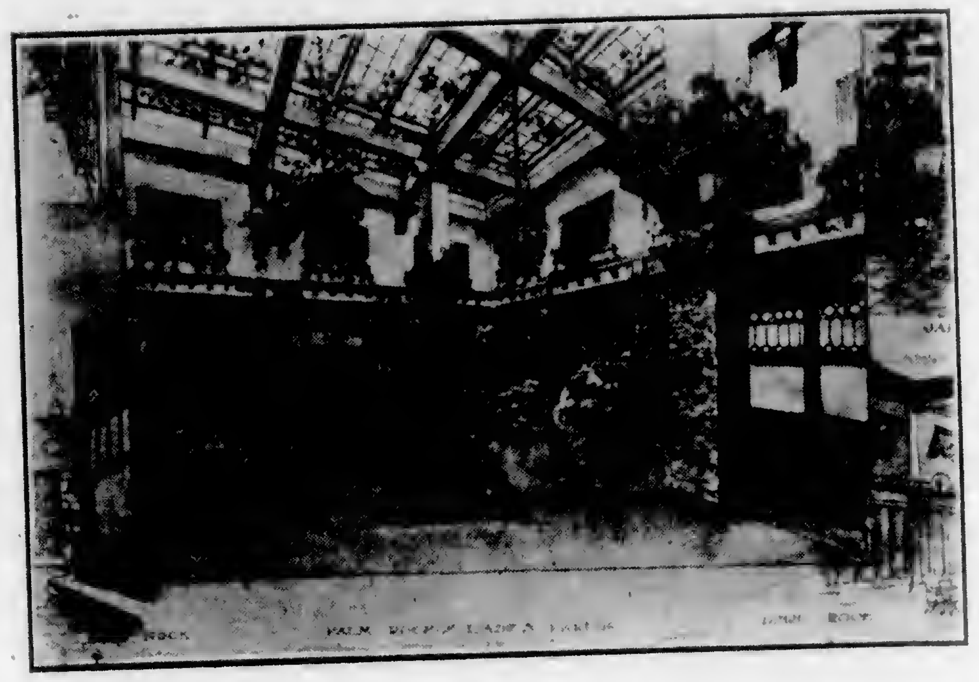
The general arrangement of the floor plan of the hotel is as follows: A large dining-room is placed near the center, facing directly west, with a frontage of 142 feet, overlooking the bay and an equal frontage overlooking a sunken garden in the rear. To the south of this dining-room occurs the lobby and palm room, 58 feet by 153 feet, facing the front garden and also the tunnel road, with a hall and banquet room back of same and guest rooms beyond. To the north of the dining-room are located the culinary department and servants quarters.

The whole interior will be carried out in the English style, both in decorations and furnishings.

A maximum amount of public space and a maximum number of rooms are arranged to overlook the bay and the hotel grounds. There will be a promenade porch on the front of the building 542 feet long, from which guests may obtain a panoramic view of the surrounding country.

The hotel is to be equipped with every modern convenience to be found in similar buildings in other parts of the world. It will be strictly first-class in every way.

Front Porch, Claremont Hotel



Palm Room and Ladies' Parlor, Claremont Hotel

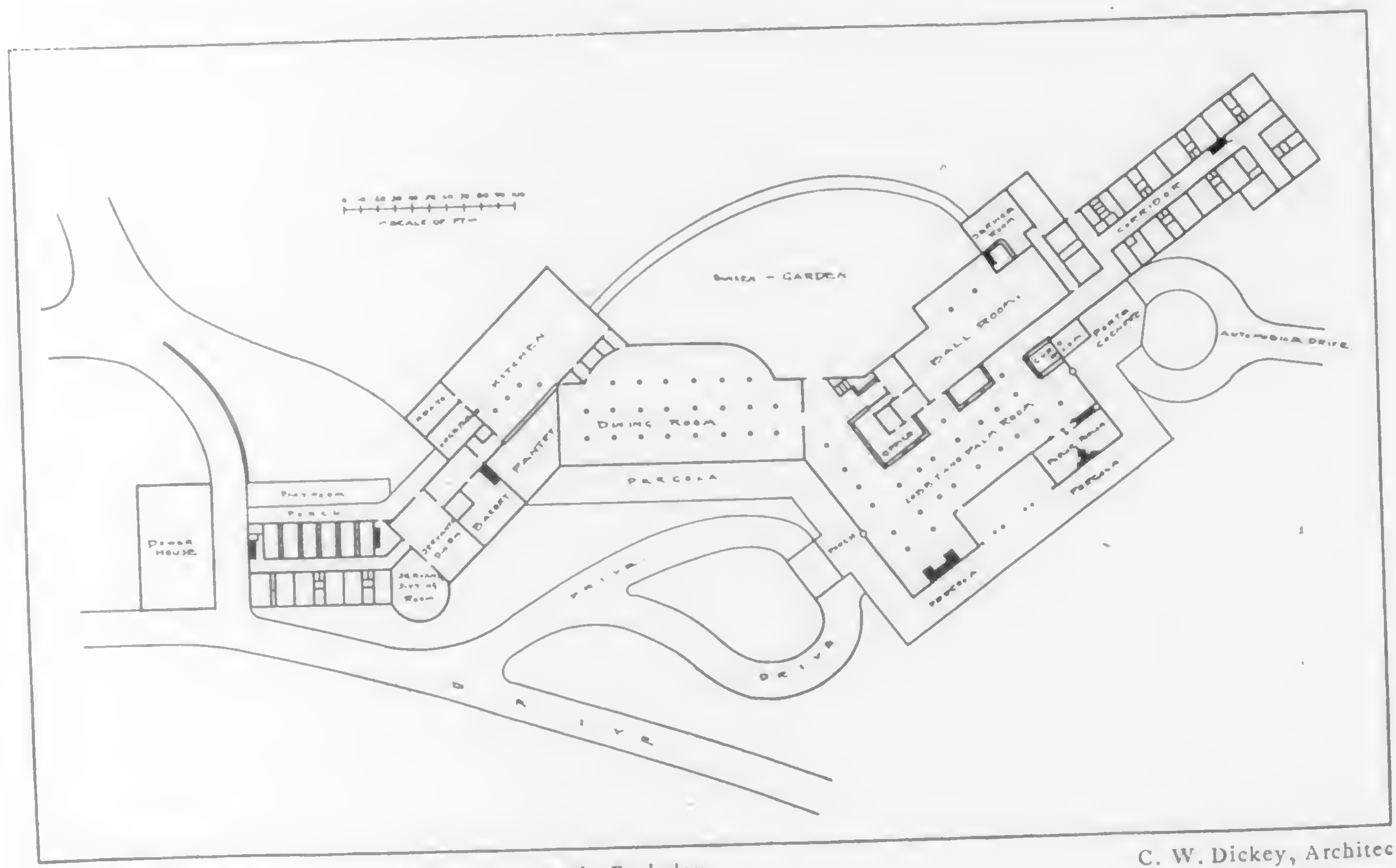
The culinary department power plant, and public rooms are designed large enough to accommodate 100 more guest rooms should it be desired to add them.

There is to be a complete refrigerating and ice making plant, laundry machinery, electric lighting and steam heating plants and hydraulic passenger and freight elevators; also a bakery, pastry kitchen, butcher shop, etc. Service and pipe tunnels will extend under the entire length of the building with a track and cars for carrying trunks, etc.

To the south will be located a club house containing billiard and card rooms, bowling alleys and bar, lockers and dressing rooms.

About fifteen acres have been added to the original hotel buildings, and on a portion of this land will be located the tennis courts, etc.

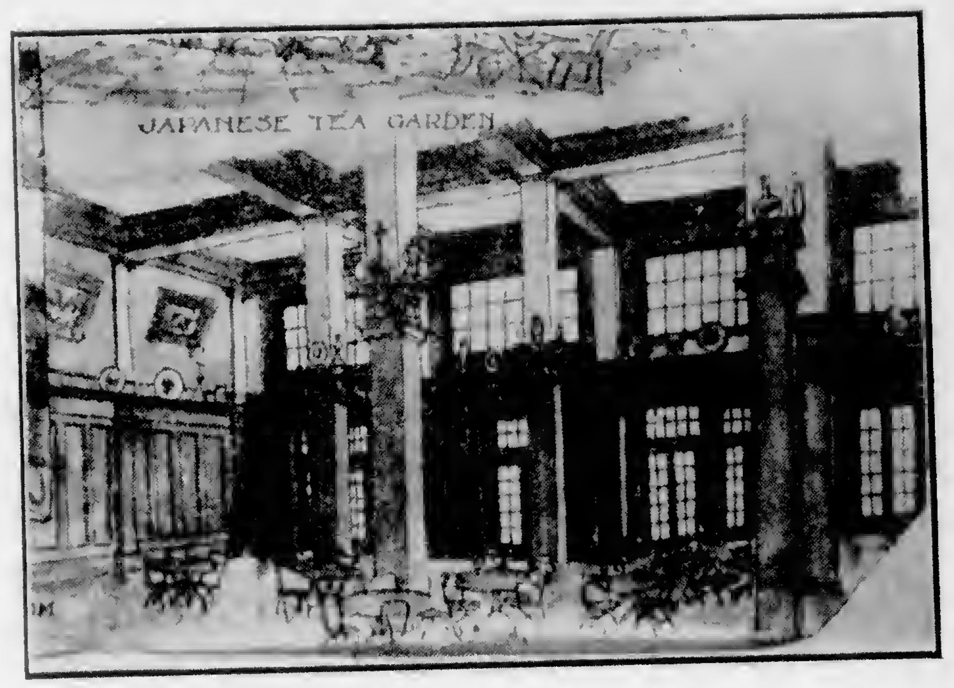
Beautiful drives will lead from the hotel in all directions through the foot hills, and, with tne Berkeley Greek Theater and other local attractions, the guests need never lack amusement.



Ground Plan New Tourist Hotel at Claremont Park, Berkeley

C. W. Dickey, Architect

"Engle Nook," Claremont Hotel



Glimpse of Dining Room

Earthquakes and Earthquake Proof-Buildings

By WILLIAM F. SCOTT

A MATCH will start a flame that will light a cigar. This same flame will light a city into an unquenchable blaze if the conditions of fuel and air supply are favorable and the provisions for fire protection unfavorable.

In the recent San Francisco catastrophe, says the Canadian Architect and Builder, we have a case where the fuel was the wooden buildings and the air supply that ever present draught through the Golden Gate. The earthquake supplied the match and incidentally destroyed the water supply for fire protection, which under the most favorable conditions was not of the best on account of the steep hills throughout the city. This great western port of the United States was a wooden city, the exceptions where wood did not prevail consisting of a comparatively small percentage of buildings in the business section The "Native Son" always gave as the reason for this fact that buildings of wood were safe against earthquake shocks and because of the non-combustibility of the California redwood were insured against a great conflagration.

That their faith in wood has been "shaken" and will be transferred to steel or steel concrete is the lesson written in the ashes of this catastrophe. The fire swept over an area of about seven square miles and of the buildings in this burned district the modern steel frame structure stood out in grand contrast to all other types. They even stood the test better than might be expected because few of them were built in any way different from the conventional Chicago-New York Steel Skeleton which was designed to resist static loads and wind pressure only, and in which such strains as would be caused by an earthquake tremor were not considered. The cumulative resistance in the joints of these steel frames was undoubtedly a great factor in helping them to withstand the recent earthquake shocks, but to make this function positive the joints should be specially designed for the forces they must resist. Certainly reinforcement of this sort would add greatly to the power of the building to ~~retain~~ its enclosing materials from displacement.

That the steel frames stood the test is more than can be said of their covering, or rather of the methods of binding the enclosing materials to their skeleton. The manner in which the brickwork between the steel framing of the tower of the magnificent City Hall fell in ruins about it is a good illustration of a vital point in the design of the conventional skeleton construction when applied to buildings that are to resist the strains of an earthquake shock. This tower was built on a steel skeleton frame well braced in the circumferential framing, but not provided with steel bracing in the vertical radial planes. The walls of the main building and colonnade which formed the architectural base of the tower were of ordinary masonry construction and served the purpose of bracing the steel in the radial planes, thus when these walls were disturbed by the earthquake shock the tower was free to oscillate, which in turn caused the displacement of the spandrel filling between the steel framing.

The tremors of an earthquake pass over the face of the globe as waves in the fluid earth. They are more complicated than the waves of the ocean, but their effect upon a building is analogous to that produced upon a boat at sea. There is a vertical and a horizontal force in the motions of these waves, therefore, if a building is to safely ride them it should be built with the same continuity and rigidity of frame as is obtained in the great ocean liner of today which, considered structually, may be likened to a pair of huge curved plate girders braced transversely with trusses and gusset portals. The ideal earthquake-proof building, then, should be, figuratively speaking, an ocean liner on end with the stern supported on a sufficient base of concrete and with the windows built in the same manner as are the port holes of the ship. But the architect is not permitted to make such radical departures from the conventional types of buildings. He must have square windows and pierce one-third his walls upon which he must write the alphabet of historic architecture. The ideal, therefore, is impossible, but a compromise between the ideal and the common type of skeleton construction is practicable.

It is beyond the scope of a short article to enter into details as to just what such a compromise would be; these details would vary with the individuality of every engineer who attacked the problem. However, I would premise three certain and fundamental requirements that must be considered in these details:

(1) There must be a rigid connection between the columns and girders of the skeleton frame, but flexibility must not be sacrificed to rigidity.

(2) There must be continuity in the foundation for the skeleton.—The writer is of the opinion that the principle of constructian of the "lighter" should be kept in mind for these foundations.

(3) There must be a comprehensive method of binding the enclosing masonry with a view to making it an integral part of the skeleton.

Steel-concrete and steel were mentioned above as competitors for place in the faith of future earthquake-proof builders. The developments in this method of constructian are comparatively recent, chronologically speaking, but there is no doubt that reinforced concrete will be an important factor in the development of these buildings. Earthquake-proof building, we have said, must have continuity and rigidity of frame and must withstand severe shocks. The driving of reinforced concrete piles 35 or 40 feet in length without any shattering proves that the resistance of this material to shocks is very great; and as for the continuity and rigidity of this form of construction there is no more ideal method of obtaining both. It is just a question of placing sufficient reinforcing material where it will perform these functions.

Terra Cotta and Brick

Notes on the San Francisco Fire

By F. W. FITZPATRICK

Executive Officer International Society Building Commissioners

(Probably no man is better informed on fireproof construction than Mr. F. W. Fitzpatrick, who describes his personal observations of San Francisco buildings after the great fire. Mr. Fitzpatrick is consulting architect and secretary of the International Society of Building Commissioners and Inspectors. This gentleman from Washington has a faculty of speaking out what he thinks, or, rather, writing out what he thinks, regardless of whom it may strike. If there are any evils to be uncovered he invariably succeeds in finding them.) Ed.

I REGRET that I cannot comply with the request of The Architect and Engineer of California for a copy of my report on the San Francisco earthquake and fire now being prepared for the Society of Building Commissioners, the United States Government, and other bodies interested in building. I have but just returned from California, and it will be days before the voluminous mass of data gathered can be put together in tangible shape, long after the Architect and Engineer will have gone to press. However, it is with pleasure that I am specially dictating these few notes and forwarding them with copies of some interesting photographs taken in the fire zone.

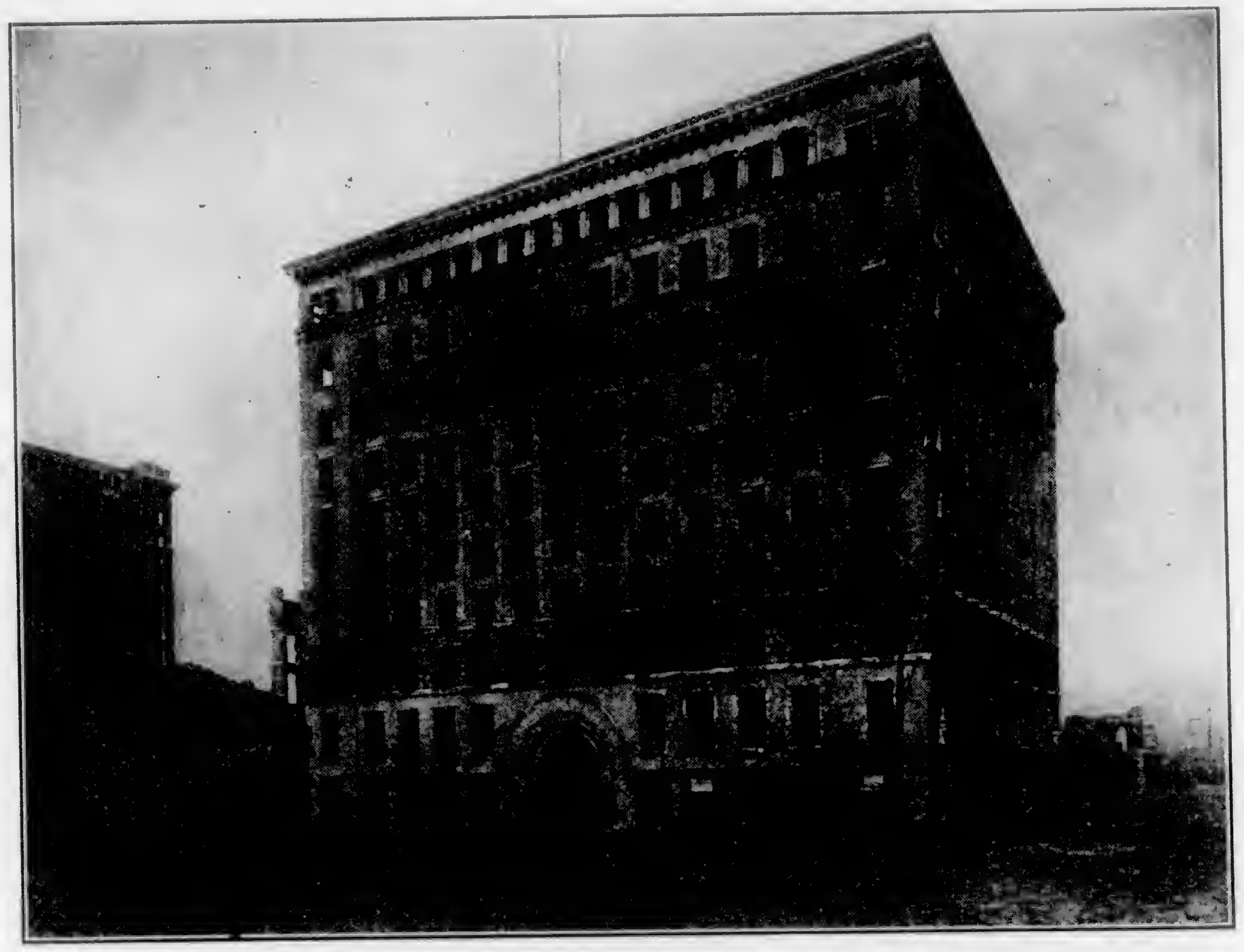
With unfortunately rare exceptions, San Francisco's buildings were not up to the highest standard of construction. With conflagration imminently possible—the city was 90 per cent frame and, with New Orleans, the most vulnerable to fire in the country—and earthquakes of more or less severity constantly recurring, the city should have been from 14 to 20 per cent better and consequently more expensively built than the great cities of the East, while, as a matter of fact, she was from 15 to 50 per cent poorer built than New York, Chicago, Philadelphia and Washington, or the new Baltimore.

The climate is not severe, and the people, not requiring extraordinary provision against temperature extremes, had grown lax in their demands, and, indeed, would not pay for the highest class of construction. Architects did not make a brave stand against this popular neglect, and many showed real indifference to, if not ignorance of, sound construction. And, of course, the manufacturers of different materials, in pretty fierce competition with each other, furnished what the market demanded, *ordinary* materials. These materials, even the best, put together under indifferent supervision, have done their work as might have been expected, and the results are apparent to the trained eye, if not to the casual observer. Officially or otherwise, I have very carefully inspected destroyed or damaged buildings after all the great fires or natural disturbances occurring in this country during the past twenty-five years, and nowhere have I seen evidences of less provision being made against the manifestly possible contingencies than in San Francisco.

Even in the best classes of construction, rather poor mortar was used, and sometimes in very exposed places; and the bond, not only of brickwork, but of concrete and every other material, to the carrying parts or frame was lamentably insecure. In the earthquake, even if the parts were not thrown out, joints of poor mortar were bound to open, offering free ingress when fire swept along, to do great or little damage to that frame, as the nature of the so-called protecting material permitted.

In the cheap buildings many walls were thrown out bodily, particularly gables, by the quake. The unthinking blame these collapses on the material, and it is quite common to hear people say that wood is the only thing that will stand an earthquake. In every case, fallen brickwork will clearly show two things, that the bonding was poor and that the tying of the parts together was poor. Gable ends were cocked up in the air without much other tie to the roof than the flashing metal, virtually independent walls that even a good windstorm might blow over, let alone a quake of such violence as to throw over heavy bookcases standing against the wall, to shove pianos four and five feet away from their original location, to upheave streets and to twist rails much as you can a piece of cardboard. It was one of the most severe quakes that history records. Visit the unburnt portions above Van Ness avenue and note the quake effects upon wood construction. Houses tilted this way and that, like the card buildings of our youth; porches wrenched away from their moorings; absolute collapses in every direction. That wood stood as well as it did is attributable not to the material, but to the fact that to get a frame house together in inhabitable shape its parts have to be well nailed. The *nails* saved the wooden buildings if anything did. And if one-half the tying and binding that was done with nails in the wooden houses had been bestowed with the ordinary means at hand on the brick and stone structures, these would have given a better account of themselves.

The term "saved by" this or that material is being very liberally applied to the Class A and other buildings in the fire zone that were saved. Any such claim for any specific material in any one case is distinctly misleading and untrue, and is simply being made use of by skillful and rather unprincipled advertisers in an endeavor to mold public opinion in favor of their specialty. A particularly well-planned campaign is being waged by the interests opposed to the brick and other burnt-clay products. Even a superficial examination of the burnt districts shows the untenability of such claims. Note the Union Trust Building, the Aronson, the Mutual Life, for instance, and see how brick and terra cotta demeaned themselves. Note also the Mills Building. In fact, most of the so-called fireproof buildings had much brick and terra cotta about them, that of course stood infinitely better than granite or stone, and will require far less cost of repair than the stone or other structures. Just as a slight comparison between brick and stone, for instance, note the West Gate Apartment House, with the first two stories of stone completely demolished, while the upper four, of glazed brick and glazed terra cotta, are virtually undamaged. So in most cases did the brick and terra cotta work of light courts and division walls stand splendidly, wherever proper care had been used in the construction. Note the court of the St. Francis Hotel, where the face brick had not been properly bonded to the backing. Of course, that facing has almost entirely disappeared. And so it will always be with any work of however good material when it is improperly done.



Mills Building. The First and Second Stories of Stone Are Badly Damaged. Upper Stories of Brick Not Seriously Damaged
John Galen Howard, Architect

In the Class A buildings *one* provision against quake had been taken in most of them. Their steel frames had been extra braced with diagonal and other what is usually termed "wind-bracing," and the result is evident. Wherever the protection of that steel against fire was at all adequate, the frame has stood perfectly and has successfully parried the rude assailment and buffeting of an awful quake. As far as the protection of those steel frames is concerned, wherever the work has been well designed and well executed, the results are satisfactory; where not, all and every system has been grossly inadequate. It is foolish to expect a two and three inch or even a four inch tile column covering, merely held in place at the corners with galvanized iron U's, to keep its joints intact in a quake and to thoroughly protect the steel member against 1500 and 1700 degrees of heat. And it is still more foolish to wrap that column with wire lath and plaster or a little concrete, in a vain effort to keep the member safe from fire. Then, in many cases, steam and other pipes have been placed against the columns inside of this fireproof casing. They have buckled, thrown off the fireproofing, and the results are seen in a hundred cases. Note the columns bent and out of shape in the Aronson Building, and in the Rialto and other places that have been protected by tile; and note those concrete-protected in the Hamilton Hotel, the basement of the Rialto and in the Fairmont Hotel. You will be convinced of the necessity there is to take extra precaution with columns, whatever material is used.

Tile floor arches gave a good account of themselves in most cases. The Flood Building, the Mutual Life, the New Chronicle, are in remarkably good shape, while those of the Crocker, the Mills and the upper floors of the Union Trust show up very badly. The concrete floors of the Call, the Sloan, the Shreve, the Grant and the St. Francis Buildings did well, while, on the other hand, twenty buildings of concrete-floor construction failed miserably. Most remarkable of all is the Fairmont Hotel. There the external fire was not extraordinary. Exterior stone and terra cotta work is in remarkably good condition and would lead one to believe that the building could be occupied in a very short time. There was nothing to burn in it but the finished door casings and the floors, yet the interior, in great part, is an absolute wreck, the steel work disjointed and literally wrapped into bowknots, and the concrete floors and partitions a mess of rubbish and tangled wire. The building can hardly be repaired for one-third its entire cost of construction.

The Roebling system gave a far better account of itself than did expanded metal, as a rule.

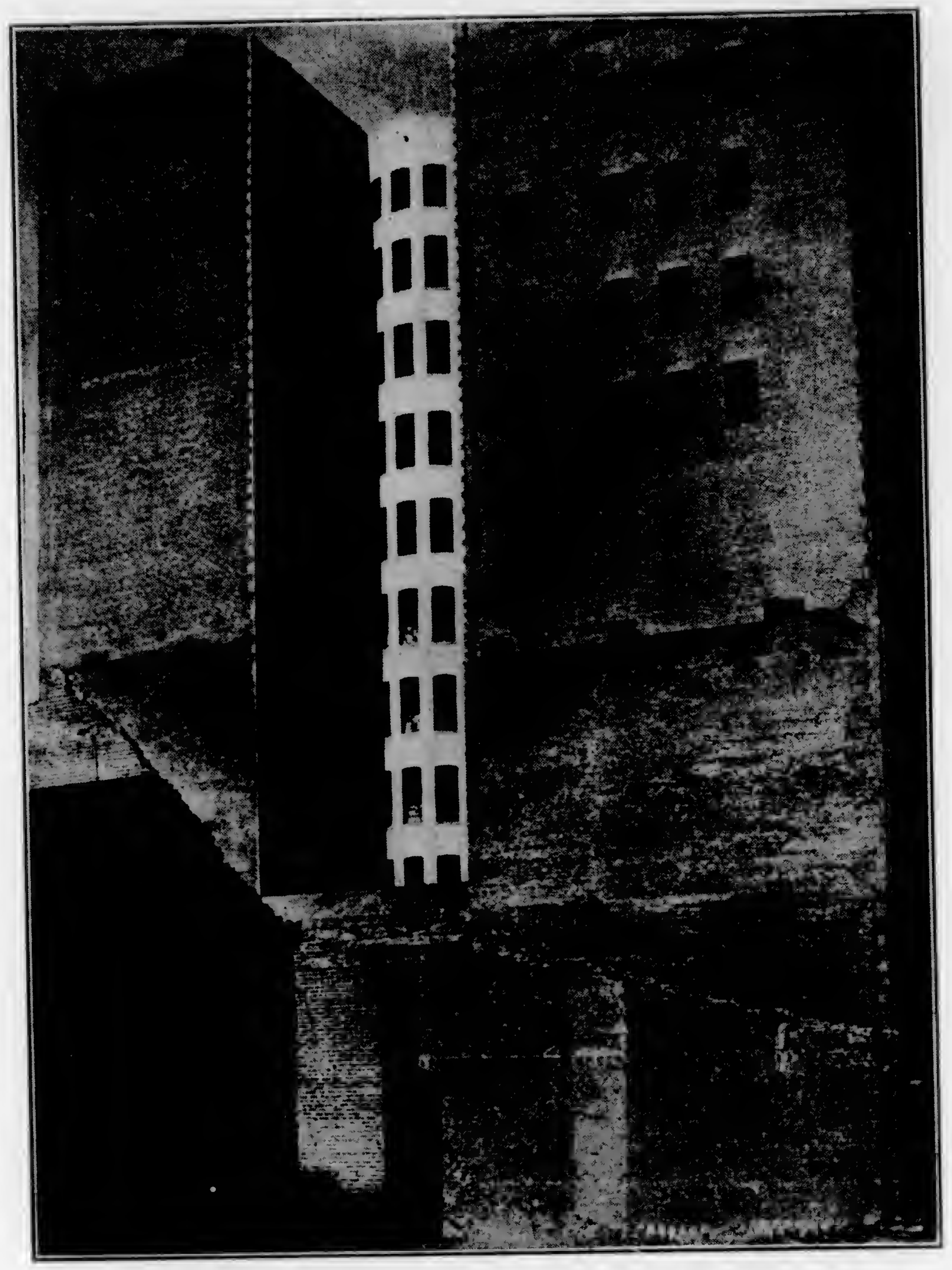
The Monadnock seemed to get the least fire, while the Mills Building was in the hottest of it.

The Kohl Building stood remarkably well. Even had the fire been particularly hot, its metallic doors and casings would have offered additional protection. As it was, the fire was not even intense enough to break some of the upper-story windows and gained no access to the building. Elevators were running and people occupying their offices within a few days. So with the New Chronicle Building. The repairs to the fireproofing there will not exceed $500. This latter was fireproofed in tile, while the Kohl was a concrete construction.

The new postoffice, the Appraiser's warehouse and the Mint were comparatively little damaged by fire. These buildings were somewhat isolated, of very substantial construction, and had the advantage of some local force to battle with incipient fires wherever started. Not so with most of the other buildings. There the tenants were driven out and the structures were virtually abandoned early in the fire.

One thing, not very extraordinary, but that is very surprising to the layman, is that the California Electric Supply building stands, in a pretty hot fire zone, comparatively unscathed and with the work going on the next day after the fire, the paint hardly blistered on the interior. Yet this building was of ordinary brick walls, with so-called slow-burning wood frame, virtually a forest of timber. These people were wise enough, however, to protect their windows with wired glass in metallic, automatic-closing sash. Undoubtedly the wired glass saved this building. It protected it from external fires while a few devoted employees fought every spark of fire on the roof and at other vulnerable points. Some unthinking ones say that that mode of construction of heavy timber must needs be the proper caper, since it stood so well. There was one other so-called "slow-burning" building of similar size that went up in smoke in forty minutes! Its windows were not protected with wired glass.

What folly it is for the advocates of this or that system or material to claim all the benefits of salvage by reason of the use of any particular one thing. Building is a tangible science; there is nothing occult or mysterious about it, and one can learn all there is to know if he will take the time and trouble. Quacks only lay claim to all-saving grace, etc., through some mysterious power of some one thing. Yet people believe them. Many owners of buildings perhaps conscientiously advertise them as "fireproof"



Court of Shreve Building, showing where the Hedder courses were used for Bonding, brick work in perfect condition. William Curlett, Architect.

simply because some particular part of the structure has fireproof tile in it or about it, or some portion is built of concrete, or some other one thing is done properly, and thereby absolving the owners of buildings from doing anything else to safeguard those buildings. That one act has thrown a sort of spell about all else! Gross ignorance or culpable negligence. A building is only fireproof when it is designed so in *all* respects, and *all* its materials are not only non-inflammable, but undamageable by fire. To advertise anything short of that perfection as "absolutely fireproof" ought to be a criminal offense. Tenants go into such buildings under false pretenses and make no effort to protect their goods, with the result that in a fire which may not destroy the owner's structure in toto, a tenant's goods are completely wiped out of existence; absolutely no protection has been afforded him.

San Francisco offers a remarkably good illustration of this idea or theory we have pounded into people for years, that a "fireproof" building is only as fireproof as its most damageable point, as a chain is only as strong as its weakest link. The illustration is this: where proper regard was had for the exterior of the structure, using material not readily injured

Showing Perfect Condition of Brick Court of Postoffice Building After the Earthquake and Fire

by fire, the exterior of those buildings is substantially intact or very little damaged. Where the frames were properly made and tied and braced, they withstood the quake and held all the parts together. Where these frames were properly protected with fireproofing material, and the partitions well laid and tied, and the floors stoutly and firmly built, the interior of the structure is in good shape. Where there was little of a combustible nature to create great heat, even the plastering is but a bit scarred. In the Kohl Building, where metallic or other fireproof trim was used, what little fire did creep in had nothing to feed upon and was quickly exhausted. In the few buildings where elevators or stairs were at any point enclosed, those stories were least, if any, affected by fire from within; the damage was from fire through external windows. Where these windows were protected by wired glass, as in the California Electric Building, the interior was virtually saved from damage, though violently attacked. Now then, assemble those various features together in the one building and you will have something that even the most obtuse laymen must recognize as a safe building. That and that alone will be a "fireproof" building, and until people learn to give equal attention to *all* the details of construction they will keep on building lamentably unfireproof buildings, however stout and safe some of their parts may be.

For San Francisco's rebuilding, strict adherence to these requirements is all that will secure for it just title to a well-built city. A serious mistake has already been made in not extending the fire limits. People clamor that to prevent them building cheap buildings in a still larger district would be a hardship upon the individual. A few dollars more spent in proper construction would be far less of a burden than would a recurrence of this awful disaster that, given the same conditions, is liable to, nay bound to, occur again. Indeed, in the long run, considering taxation for fire departments and all that sort of thing, it would be the very highest economy both to the individual and to the community should San Francisco be sensible enough to rebuild exclusively of Class A buildings whether high or low. But neither San Francisco nor any other city in this country will be sensible enough to adopt any such drastic rules for many a year yet, though that time will surely come. But many billions of property will have to be destroyed before we learn our lesson. We Americans clamor loudly in regard to our superiority, our great advancement and so on, but in some respects we are atrociously slow in profiting by experience and learning how to do some simple things well.

A most careful and painstaking study of the results of quake and fire in San Francisco has not changed my mind one iota as to what constitutes a good building.

The standard of a perfect building must needs be the same everywhere, save that in localities where one may naturally expect earthquake as well as fire, even greater care should be taken. First and foremost, a proper foundation is to be secured. Much of the downtown district of San Francisco is on made ground. Caissons and concrete piers would seem to be the most natural foundation there, or a reinforced concrete pile, anything that secures a firm base on broad, substantial foundations for walls and columns. For the exterior I give the preference to well-burned brick and terra cotta trimmings. Some terra cotta went all to pieces in San Francisco, while much of it is substanitially intact. People must pay for the best. A manufacturer is going to give just what he is required to and paid for. It is the architect's business to see that materials will fulfill the requirements he establishes. Terra cotta must be thick and well burnt, the inside angles well filled and no little thin ornamental parts that will scale off and let flame to the interior of the member and the carrying iron brackets. In narrow streets and where surrounded by fire risk, it must be apparent to every one that granite and sand and lime stone are the poorest things one can use. You insure thousands of dollars of damage when you use those materials in such places.

Avoid ironwork outside; all that must be used for store fronts, etc., should not be part of the structure. Let it go. Protect all external parts, like lintels under cornices or window soffits; leave not a particle of structural steel or iron where fire can get to it. Make the frame rigid and well jointed. Whatever quake movement there may be should be taken up in the elasticity of the steel member and not in the wracking and sheer of rivet connections. Tie all the facings thoroughly to the frame. Let the storied brickwork be each independent of the other, but bind it and bond it and secure it to the frame so that what movement there is to that brick wall will show itself only at the joint between stories. Then you will not have great patches of brickwork literally shoved into the street. Protect your frame from fire with a material that has already gone through intense fire in its manufacture. Floor arches and column protection and partitions I prefer of well-burned *porous* fireproof tile, in small units, but considerable depth of floors and width of partition. The best cement mortar should be used; no lime. All beams, girders and columns should be most carefully cemented first, then completely and closely fitted with concrete or brick or tile and surrounded with the protecting tile, thoroughly bonded and tied to this mass and to the steelwork. Metal fabric is cheap and when bedded in cement and remote from fire, ties the protecting material in a vicelike grip. Under no circumstances should a pipe or anything else of that nature be against the column inside of the protection. To do so is fatal in ninety cases out of a hundred. Narrow spans of deep, well-made concrete are a fair substitute for tile; but at a considerable distance from that concrete there should always be a suspended wire cloth and plaster ceiling. This will protect the concrete, as it did in many cases in San Francisco, from at least the first blast of heat and flame. Wide spans of concrete are theoretically very fine, but in practice the units are too big and one is too much at the mercy of very ordinary labor, and I discourage those wide spans wherever I can. It will undoubtedly be very difficult to get steel in San Francisco and people will probably have to resort to wide span and various reinforced systems of floor construction. For moderate heights, a reinforced concrete column or a steel-barred hollow tile block column is all right, provided in the case of the concrete one it be protected externally with fireproof tile.

But to continue with the model building: The interior finish should be of metal or asbestos or other non-inflammable material. Every outside window should have wired glass and metal or asbestos sash and frame. And in places where external attack is certain, these windows should again be protected with really good shutters or by making double thicknesses of wired glass in the sash. Internally, elevator and stair shafts should be closed at every story and with automatically closing fireproof doors. Such enclosures ought to be veritable fireproof partitions, but where light is wanted wired glass is an excellent substitute. Then, too, the interior should be cut up into as small units as possible. Great expanses of floor are much desired by retailers, but the small unit is the only safe one. Fittings and furniture should be fireproof. And every precaution should be taken so that in incipient fires they can be successfully fought and restricted to the one little unit.

In such a building and such a one *only* is there absolute immunity from destruction. The tenant's property can only suffer from insignificant local fire. His interests are best safeguarded in such a building and the owner has a permanent, non-damageable investment. And such a building is not an extraordinary affair. To do all these things well, as above described, entails skill on the part of the designer, true; but the cost is surprisingly little over the first cost of a most ordinary and flimsy affair, while, as a matter of fact, sanely considered as an investment, such a building is ultimately an *actual economy,* a source of far greater profit to the owner, satisfaction to all concerned and the best assurance of the continued prosperity and well-being of the community.

How many such buildings will the people of San Francisco be sane enough to erect?

Washington Grammar School, Fresno
Brickwork by Fresno Brick and Tile Co.
B. G. McDougall, Architect

Reinforced Brick Work

By ROBERT W. GARDNER

IT MAY not be possible for San Francisco to build as extensively as it should do of reinforced concrete, for unfortunately there are too few builders familiar with its uses, but there is one closely allied method that its builders should know. I refer to reinforced brick work. Broken stone for ordinary concrete may be difficult for them to obtain, but the bricks are there on the spot, and the steel wire or plain steel rods can be quickly gotten. No expensive lumber false work is necessary, and by the addition of the steel an eight-inch wall will be better and stronger than the plain brick work of twice that thickness, and for curtain walls a four-inch wall would be better in many instances than one of eight inches.

It is evident that the city could save millions of dollars and months of time by building intelligently with the materials at hand, providing it can break away from obsolete methods and the unyielding building laws founded on those methods.

Major Stokes-Roberts, of the Royal Engineers, has put up some remarkable examples of water tanks in reinforced brickwork for the British Government. He uses light brick walls with telegraph wire reinforcement to stand the thurst of tons of water. He makes a nine-inch reinforced wall do what no plain twenty-inch wall could do with safety without the steel, and he suggests the use of still lighter masonry. It is the principle of the wire-wound gun applied to brick work. The walls are laid up in cement mortar like any ordinary wall, excepting that wire ties are left projecting from the joints, and to these are bent light rods or wires along the surface of the brickwork.

Over this steel network a coat of cement mortar is placed, and the result is practically a reinforced concrete wall. Such a wall could be bulged or twisted by explosion or earthquake, but it could not collapse. It is knitted together and to the floors and columns with steel stitches that will not rip, and the most important of all just now this work can be done by the ordinary mechanic employed by any careful builder. Like a sailor's knot this wirework is easily done, but hard to describe. The result is a wall that will defy fire, water, earthquake, and the tooth of time.

To Practice Architecture in San Francisco

SINCE the fire the California State Board of Architecture has passed upon more than fifty applications for certificates to practice the profession in this State. The following have been granted credentials: Robert Morgeneier, 1065 Tenth Avenue Oakland; William J. McCaw; Theo. H. Skinner, formerly of Boston, 604 Mission Street; Frederick Noonan, formerly of Cincinnati, 1062 Ellis Street; O. G. Traphagen, formerly of Honolulu, 1179 Third Street; W. A. Newman, 402 Post Office Building; Creighton Withers, formerly of Newport, 1847 Fillmore Street; Mark Hay, 69 Portella Street; John Wright, 39 S. Broderick Street; W. T. S. Hoyt, 480 26th Street, Oakland; Thomas Beck, Watsonville; Henry H. Hedger, 1608 Golden Gate Avenue.

Bright Outlook For Terra Cotta

By W E. DENNISON

President of the Steiger Brick and Terra Cotta Company

OTHER writers have done and are still doing ample justice to the lurid scenes of the world's greatest holocaust. We feel almost lonesome in having escaped with no further loss than our offices in the Mills Building and a few thousand dollars worth of stock broken by the slight crumbling of the earth's surface at 5:13 o'clock a. m., April 18, 1906. Then was the commencement of the new San Francisco.

The exercises were intensely interesting and wound up with a baccalaureate sermon of flames whose eloquence held spellbound the throngs on every hilltop and devoured their every passion save that for the new city on the old site. The spirit of the days of '49 is now ancient history. The spirit of 1906 has the rostrum and will do all the talking during this century. It has appointed committees whose work will extend into the next century. "Terra Cotta" is chairman of one of the most active committees on the list, and already has to report progress—we have been awarded a forty-thousand-dollar contract for the architectural terra cotta which is to adorn the splendid new sky-scraper for the Humboldt Savings Bank to be at once erected on the southerly side of Market Street, east of Fourth Street.

Architectural terra cotta is too well established in the east to yield its own place to the onslaughts of the reinforced concrete men. I know full well that reinforced concrete has a very valuable place in structural work and will receive, at the hands of our architects the full measure of recognition, no doubt, but owners and everybody else will find that the class "A" buildings will not be put up without their full share of terra cotta ornamentation. Our best buildings here stand as monuments to its worth today, and are the best possible arguments that can be placed.

We, of course, have made a mistake in California, that is not likely to be repeated, in fire proofing. It has been well known for some years that terra cotta fire proofing should be porous and not dense, but owners and architects have been loath to incur the slight additional expense necessary to producing porous terra cotta. All of these facts will now have their proper recognition among the best class of architects, and the new buildings of San Francisco, where fire proofing of this nature is required, will be up to date with the best eastern practices.

The masterful lady with her meek spouse stood at the hallowed grave of her first husband. "Here," she said impressively, "lies a hero. You would not have been my husband today, Henry, had not John been killed at Gettysburg."

"Yes," cried Henry, with considerable feeling, "war is indeed a curse."

"By George, but I've got a jewel of a girl. I proposed by wire and told her to answer at my expense."

"Well?"

"And the frugal little thing waited until 6 p. m. and got night rates." —Courier-Journal.

Cement and Concrete

Reinforced Concrete Frame Construction

By JOHN B. LEONARD, C. E.

THE term "Reinforced Concrete Frame Construction" will be understood as describing a building constructed of slabs, beams, girders and columns enclosed by curtain walls which are supported by the columns.

All the exterior forces to be resisted by this frame will be of the same character as exist for a frame constructed of any other materials. The proportioning of the resisting material, however, involves many variations from the conditions involved in designing steel buildings.

The first consideration of the designer is to secure as regular an arrangement of the columns as the convenience of the building will permit. A simple arrangement very materially decreases the labor of designing and also the cost of the construction of the building. Irregular arrangements very greatly increase the cost of forms, which is an important item in the expense of the building. A few such complications will increase the cost of the form construction to as much as $15.00 or more. A regular arrangement also permits of the use of materials to much better advantage.

SLABS—Rectangular slabs recommend themselves because of their economy. They enable the designer to take advantage of the reduction in bending moment by their ability to carry the loads to four supporting beams or girders. This condition, of course, involves reinforcing in both directions, which is an advantage, as it makes the slab of uniform strength. For constructive reasons, the slab should, under no condition, be less than three inches in thickness, and better be provided with haunches at each of its points of support, to avoid the objectionable sharp re-entrant angle. It is better to place the reinforcement in position, where possible, before the concreting is commenced, and carefully examine it to see that it conforms strictly to the designer's plans both as to amount and position.

An essential condition is that reinforcements be provided at the points of support to fulfill the case of continuity. Many who are designing work of this character are sometimes reluctant to do this because of the increased expense and an improper appreciation of its importance. A vast amount of faulty work can be directly attributed to the omission of this important detail.

If a mesh reinforcement be used, it should continue throughout the entire area of the panel in the bottom portion of the slab and additional sheets placed in the top over the points of support and extending a proper distance into the slab.

If rod reinforcement is contemplated, this continuity condition can be fulfilled by the bending up into the top portion of the slab, each alternate rod, the bend to be made at a point about .2 of the span measured from the support. Where one dimension of the slab considerably exceeds the other, it can only be designed as a beam in one direction, but some reinforcement should be used parallel to the longer dimension.

A comparison of the costs of these two types of slab reinforcement will, the writer believes, show that the rod reinforcement is economical for slabs of 4-in. in thickness or over. The shear condition in the slab seldom becomes a criterion but should always be examined.

BEAMS AND GIRDERS—The designing of beams and girders can be approached from two points of view. First, that of considering them as "T" beams; and, second, by treating them as simple beams. The treatment of the members as simple beams eliminates some possibilities of fault through careless workmanship. If the beam and slab are cast at one operation, or if the joint in the slab between two days' work be properly staggered, and before the second day's operations commence, cleaned, roughened and cemented properly, there will be a true "T" action.

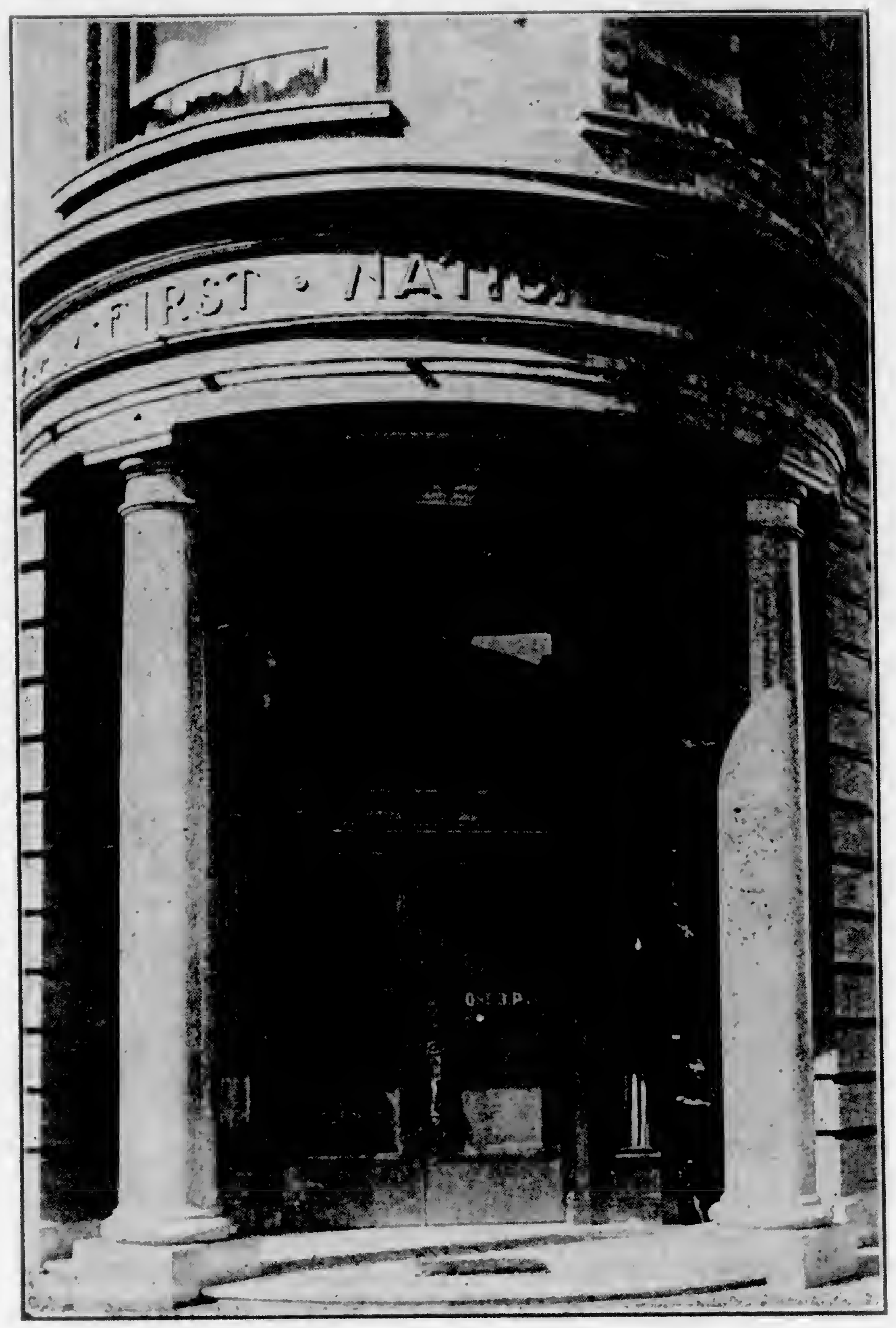
The simple beam eliminates the doubt that might exist as to the above precautions having been properly executed but suffers the disadvantage of requiring more depth. This additional depth compels the increase of the height of the building in order to preserve the story clearance desired.

In beams and girders, shear conditions must always be carefully examined and in a large percentage of cases special provision made for their proper disposal. They should also be reinforced for continuity as this condition surely exists in this type of construction. The reinforcing of beams and girders is better accomplished by the use of a number of small-sized bars than by a few large ones; usually, however, there is not much latitude for variation in this direction because of the necessity of preserving a proper amount of concrete surrounding each rod. If plain rods be used in the reinforcement, care must be taken to see that the proper amount of surface for adhesion is presented to the concrete.

The continuity reinforcements, for constructive reasons, better be reduced to as few in number as possible, particularly in the girders. In the case of four girders supported by a column, there becomes an objectionable multiplicity of rods through the columns unless this precaution be observed.

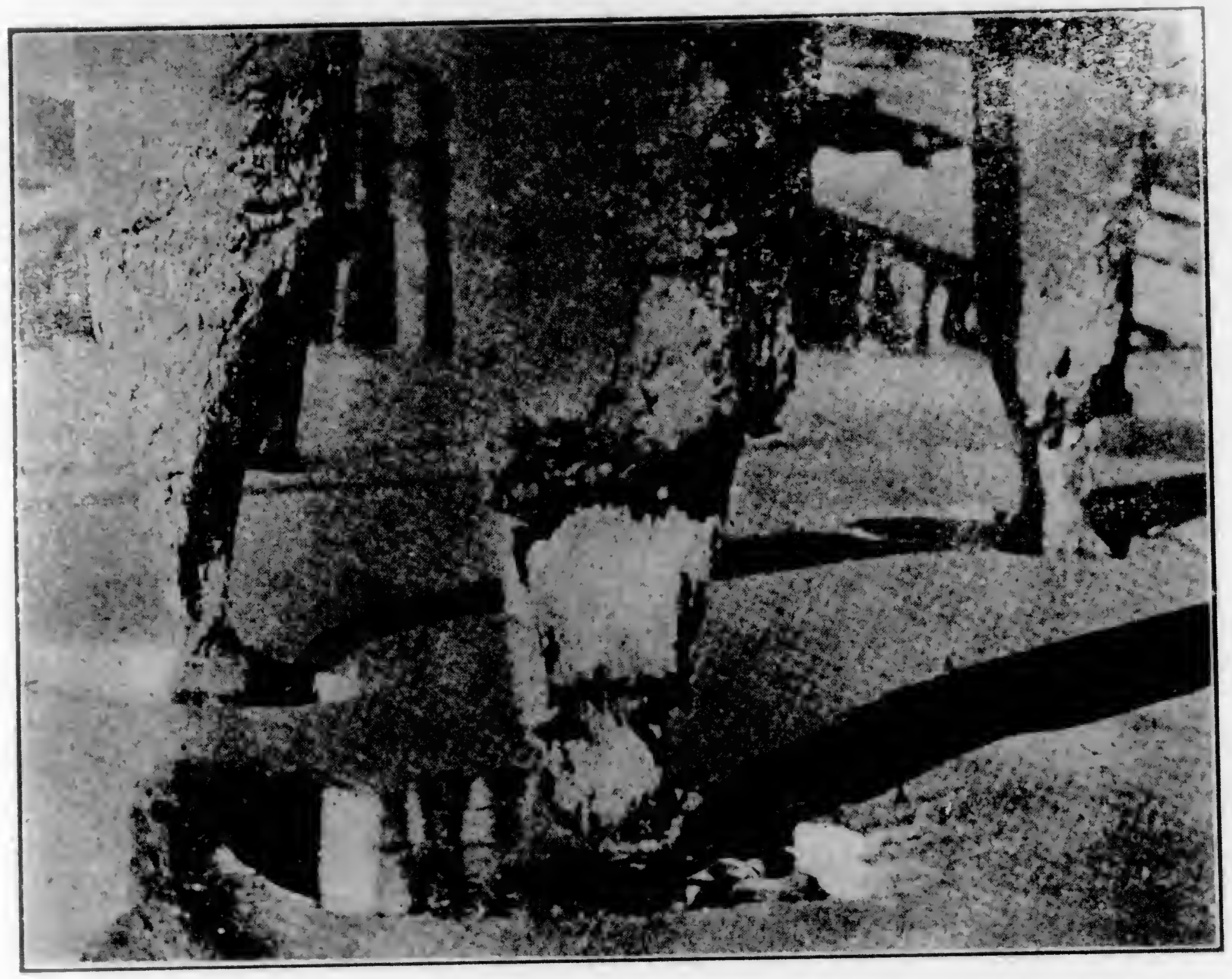
All girders should be provided with good substantial haunches, making an angle of not less than 45 degrees with the beam, and preferably 60 degrees. The writer believes it to be prudent to reinforce these haunches with at least two rods, these rods extending from the upper edge of the beam to the opposite side of the column. This is desirable because the inertia of the section of the beam, including the haunches where it joins the column is available to resist tranverse stresses occurring from external forces.

Provision for the proper disposal of the shear stresses can be made by the turning up of the rods used for the bottom flange reinforcement and where such rods are turned up, they should extend to as near the surface of the beam or slab as fireproofing conditions will permit. This turning up can commence at the point in the beam where the bending moment permits elimination of reinforcement for flange stress requirements. Under ordinary conditions, this detail will be sufficient to properly care for all shear stresses, but in cases where it does not, the designer can avail himself of the continuity bars which will, I think, meet almost the worst conditions.

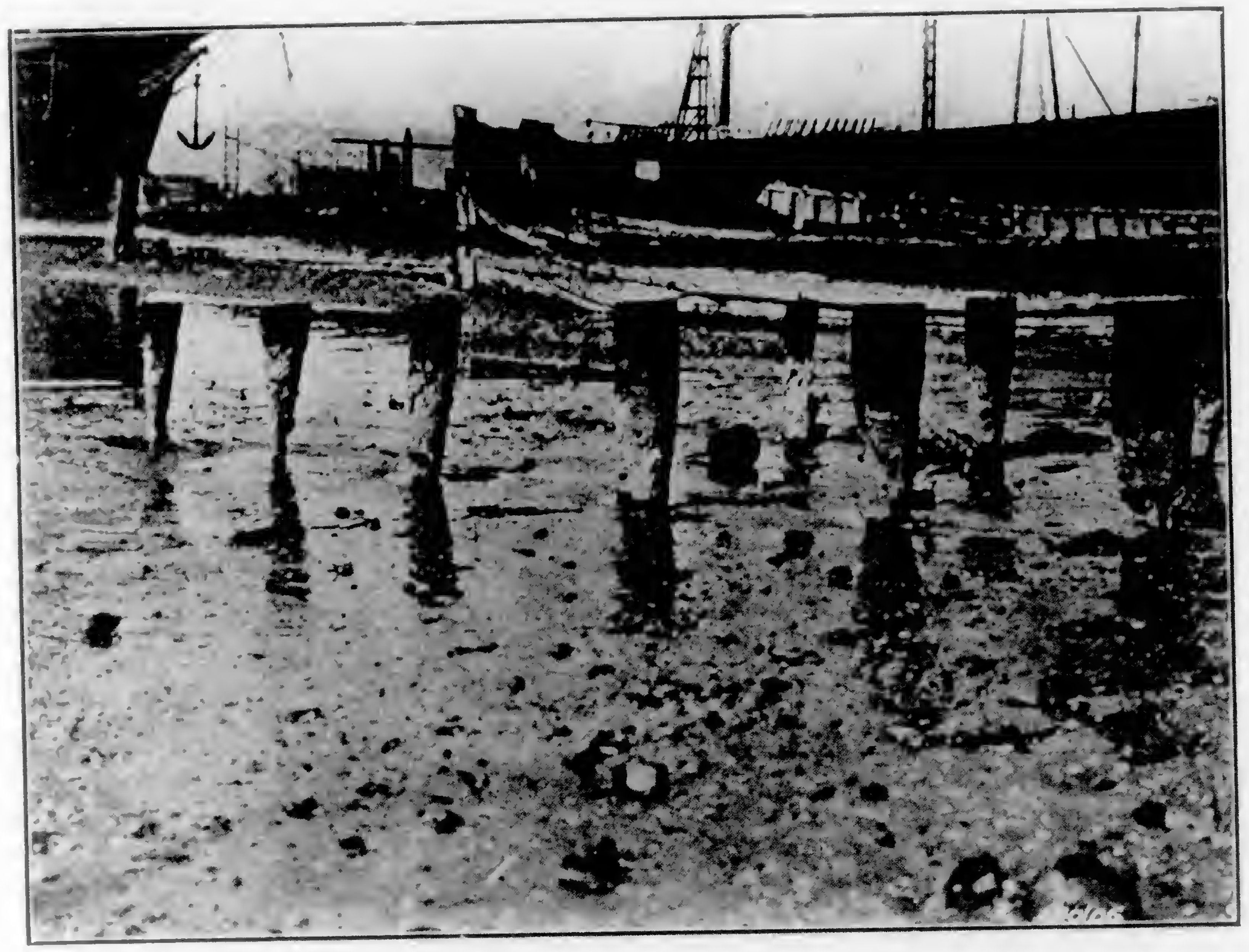


Detail of Entrance First National Bank, Visalia
Millwork by W. K. Spaulding Lumber Co. B. G. McDougall, Architect

In deep girders under heavy loadings, vertical shear bars or stirrups are certainly on the side of safety. The introduction of top reinforcements in such girders is desirable for the purpose of resisting possible lateral deflections. By passing the shear bars around the top of reinforcing members, the mass of concrete is bound together in such a way as to greatly enable it to properly perform its functions. That any amount of compression duty can be assigned to these top reinforcing bars is a matter of some doubt and it is hoped that the subsequent discussion will touch upon this point. If it can be relied upon, it is a valuable attribute, because there frequently arise conditions in a building where the depth of the beam is so limited that there is not sufficient mass of concrete above the neutral axis to resist compression stresses. Many such cases, however, can be properly solved by the introduction of larger haunches in the top of the beam. All beams and girders should be examined for horizontal shear along the neutral axis. This condition influenced the minimum width of the beam. In the case of "T" beams, the maximum width of the beam is affected by the thickness of the slab and usually limits its width to about three times this thickness.



Creosoted Wooden Piles, Showing the Effect of the Teredo and Limnoria; from a Photograph Taken at San Francisco a few Days Before the Earthquake



Wooden Piles and the Hull of a Wooden Vessel, Showing the Destruction Wrought by the Teredo and Limnoria From a Photograph Taken April 17

Strong Argument for Concrete

THE two pictures of creosoted wooden piles shown in this number of The Architect and Engineer of California were taken in San Francisco and Oakland by Frank B. Gilbreth, the well-known contractor. They show the effect of the teredo and limnoria on wooden piles exposed to the salt water, and offer still another conclusive argument for the use of reinforced concrete for foundation work.

Figure I shows a creosoted wooden pile in San Francisco almost entirely destroyed by the teredo and limnoria. In the vicinity of Puget Sound, Mr. Stewart, assistant chief engineer of the Great Northern Railroad, states that a stick of timber, rough sawed, will last about eight months; a peeled pile will last a year; a pile with the bark on will last a year and a half, and a creosoted pile from fifteen months to fifteen years. Such piles, however, even when driven under the same conditions, will be attacked entirely differently by the teredo and limnoria. Both of the accompanying pictures show piles that have been coated with a coal tar or creosote compound.

Referring to the recent disaster, Mr. Gilbreth, who has many large structural enterprises now under way in San Francisco, states:

"While it is practically impossible to put up any structure which is able to withstand an earthquake shock of great intensity and varying motion, it is possible to erect buildings capable of weathering a shock such as the recent one in San Francisco. The great devastation resulted more from the flame than from the earthquake itself, and this fact emphasizes the importance of using reinforced concrete for fireproof structures. It is safe to say that if the business section of the city had been constructed of reinforced concrete, the fire resulting from the upheaval would never have gained headway."

Structural Association of San Francisco

THE STRUCTURAL ASSOCIATION of San Francisco is a new organization that has come into existence since the burning of San Francisco. Meetings have been held once a week at temporary quarters in the Ferry building. The association is taking an active interest in all matters pertaining to the rebuilding of San Francisco from structural and engineering standpoints and it has shown especial agility in promoting and encouraging the use of reinforced concrete.

Prof. Charles Derleth, Jr., secretary and treasurer of the association, has sent out the following announcement:

I beg to inform you that at a meeting of the association, held in the rooms of the Harbor Commission in the Ferry Building, on Thursday, the 24th inst., upon recommendation of the Committee on Permanent Organization, it was unanimously agreed that the name of the organization be the Structural Association of San Francisco.

Scope:—The investigation and discussion of earthquake and fire phenomena and the formulation of conclusions as to the manner in which the best type of building construction should be modified to conform to the conditions observed.

Membership:—All persons directly concerned in the design, manufacture and use of structural and fire resisting material, are eligible for membership.

The following permanent officers were elected to serve for one year:

President—Professor C. B. Wing, of Stanford.

First Vice-President—Mr. W. J. Miller, of San Francisco.

Second Vice-President and Chairman of Executive Committee—Mr. Lewis A. Hicks, of San Francisco.

Third Vice-President—Professor Loren E. Hunt, of the University of California.

Secretary and Treasurer—Professor Chas. Derleth, Jr.

I.—Executive and Editing Committee (consisting of the Second Vice-President as chairman, and the chairman of each of the remaining committees as members).

II.—Committee on Foundations—Carl Uhlig, chairman; C. H. Liedbeck, Oscar Haupt, H. M. Smitten, M. J. Mayer, J. B. Balcomb.

III—Steel Construction and Design—C. H. Snyder, chairman; F. S. Edinger, J. D. Smedberg, Maurice C. Couchot, Chas. Derleth, Jr., H. C. Banks, N. C. Vensano.

IV.—Floors, Roof and Roof Covering and Ceilings—J. D. Galloway, chairman; F. A. Koetitz, F. K. Amweg, Smith, Emory & Co., Mr. Hoyt, Alex. P. Farago, Mr. Clark, A. E. Roberts.

V.—Fireproofing of Steel, Partitions and Interior Finish—Morris Kind, chairman; Mr. McBean, Jr., Percy Stuart, Loren E. Hunt, G. M. Scofield, John H. Gray, S. J. Johnson, F. H. Meyer.

VI.—Exterior and Floor Openings—Mr. Thurston, chairman; F. R. Muhs, R. S. Chew, Mr. Gates, Henry A. Gardner, Mr. Herrick, Arthur Cassidy, F. W. Kerns.

VII.—Reinforced Concrete—John B. Leonard, chairman; Victor Ross, Luther Wagoner, R. C. Berkeley, G. R. Field, Theodore Skinner,Chas. T. Dudley, R. Keatinge.

VIII.—Earthquake and History—Chas. C. Moore, chairman; Bruce Cornwall, Loren E. Hunt, Geo. Wagner.

Damp Proofing Reinforced Concrete

One of the most interesting meetings yet held by the Structural Association of San Francisco was that held on the evening of June 13th, when Reinforced Concrete was the subject of discussion. Timely papers covering various phases of this type of construction were read by Jno. B. Leonard, C. E., Louis A. Hicks, C. E., and Maurice Couchot, C. E. Mr. Leonard spoke particularly on slabs, beams and girders. Mr. Couchot spoke along the lines of designing and the preparation of details for concrete construction while Mr. Hicks dwelt on reinforced concrete curtain walls and the problem of properly damp proofing the same.

This latter point brought out a spirited debate. Mr. Hicks urged the use of concrete curtain walls in cage construction as particularly desirable for withstanding earthquake shocks. He said that it was evident from what he had seen since the recent disaster that brick and mortar will not stand a severe temblor no matter how good the construction. He also called attention to the fact that concrete blocks, where a very large proportion of cement had been used, had proved a failure.

Regarding the damp proofing of curtain walls, Mr. Hicks suggested that a wash consisting of an oil base mixed with cement could be used, although this preparation, he declared, had not been entirely satisfactory.

President C. B. Wing said that one of the popular methods in use is to wash the walls with a neat cement about as thick as whitewash. This is particularly applicable to a thin wall.

Mr. Couchot said that some trouble had been experienced in providing a suitable wash for a two-inch wall at Chico. An application of paraffine oil was finally used, and this has given excellent satisfaction.

Mr. Skinner, a Boston architect who has lately come to the coast, said that in his experience he had found very satisfactory an application of soft soap dissolved in hot water and put on with a whitewash brush, this to be followed by a second application of alum water. He said he usually used two pounds of soap to a gallon of water and a pound of alum to five gallons of water.

Mr. Leonard said that a soap and water preparation had been used on a concrete water tank in San Francisco with excellent results. The tank has been built nine years. In San Jose, the soap and alum solution was used all through the concrete in constructing an oil tank for the Union Ice Company, and the method was entirely satisfactory.

There was a discussion over the comparison of the beam to the truss.

The question of how and when to stop work each day on the construction of reinforced concrete beams was considered. Mr. Keatinge said that his theory is that the work should go on uninterrupted for twenty-four hours, but under the present labor conditions such a plan would be next to impossible. He considered it bad and very undesirable to have a joint between the beam and the slab. We have been making the joint heretofore by splitting the large girders. No matter how well a building may be designed, I claim that if the work is not properly executed, it will not stand.

Mr. Leonard suggested that the concrete be staggered; that is, to lay in a series of three-inch timber for over night and then remove in the morning. Mr. Keatinge wanted to know if there was any objection to splitting the girder vertically and Mr. Leonard said that at first thought he should think that that would accomplish the purpose.

New Recipe for Mince Pie

The following story suggests a new recipe for mince pie. It promises a product that will stand by a man even though it fails to aid digestion:

"Once, when I was a reporter," said David Belasco at a holiday dinner, "I spent two days with a gang of tramps in order to get material for an article on tramp life.

"These tramps were a merry lot. They had as many stories to tell as the end man of a minstrel show. The excellent mince pie that we have just been eating reminds me of a mince pie episode told by one of the wanderers.

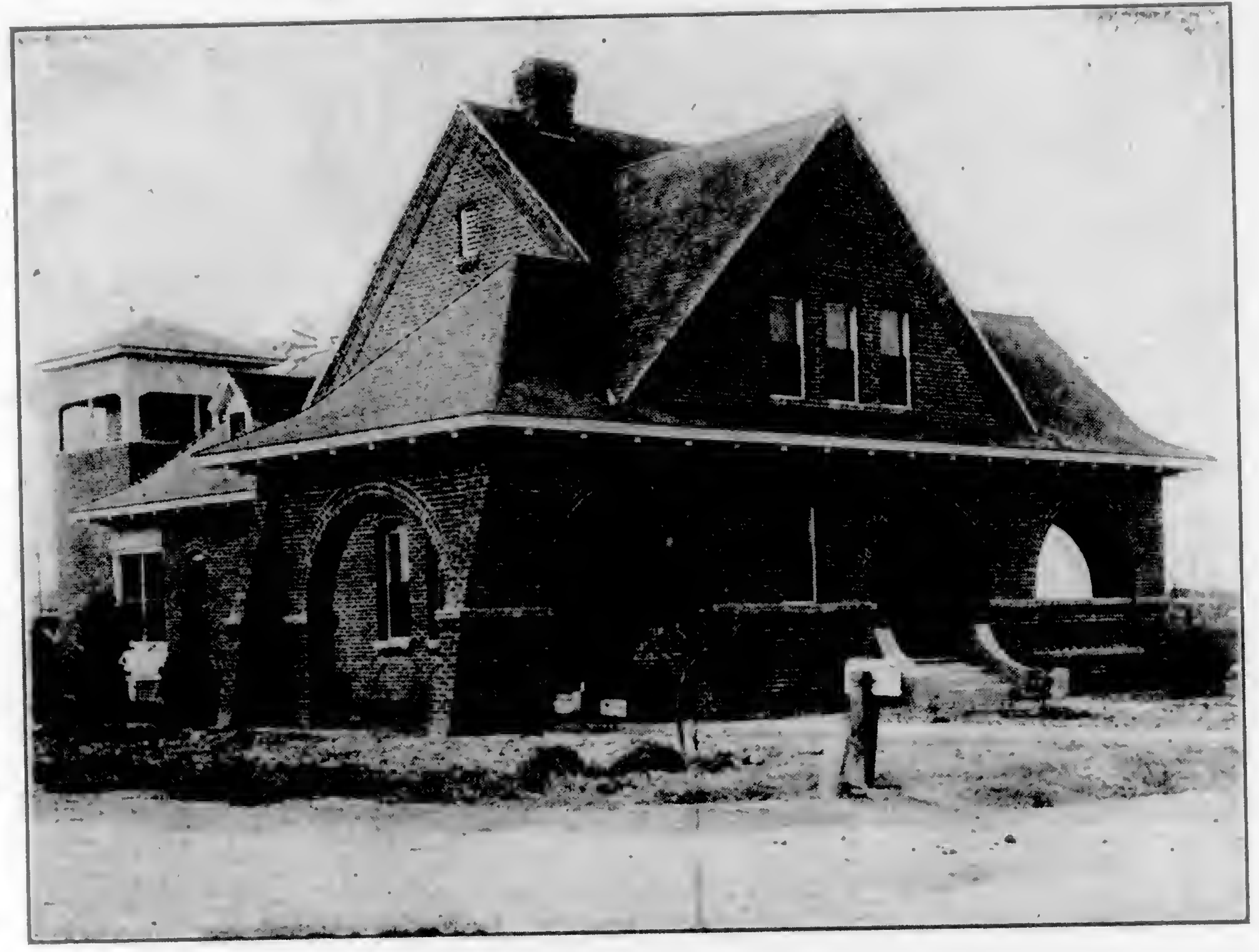
"He said that a friend of his, one cold day in January, knocked at the kitchen door of a farmhouse.

" 'Well?' said the farmer's wife. 'You here again?'

" 'Yes, ma'am,' said the tramp respectfully. 'I want to know, ma'am, if you'll be kind enough to give me the recipe for that mince pie what I had here yesterday.'

" 'Well, the idea!' cried the farmer's wife. 'Landsakes, man, what do you want that recipe for?'

" 'To settle a bet,' replied the tramp. 'My partner says you use three cups of Portland cement to one of molasses, but I claim it's only two and a half.' "—Ex.



Picturesque Brick Residence of Mr. F. J. Craycroft, Fresno

Some Fresno County Architecture

FRESNO, the garden spot of the San Joaquin Valley, proudly claims some fine examples of modern architecture, and in the works of Architect B. G. McDougall are to be found many handsome structures.

Mr. McDougall has been located in the valley, first at Bakersfield and later in Fresno, for twelve years, and during that time has planned some of the best buildings in the Valley.

Among the number is the Merced Security Savings Bank building, built of Colusa sand stone. The interior is finished in Verdi antique marble and mahogany and is arranged with particular care for the convenience of its various banking officials.

The Madera High School shows what can be done with the California Mission style of architecture as applied to a public school. It is built of brick and cemented. Mr. C. J. Lindgren was the contractor.

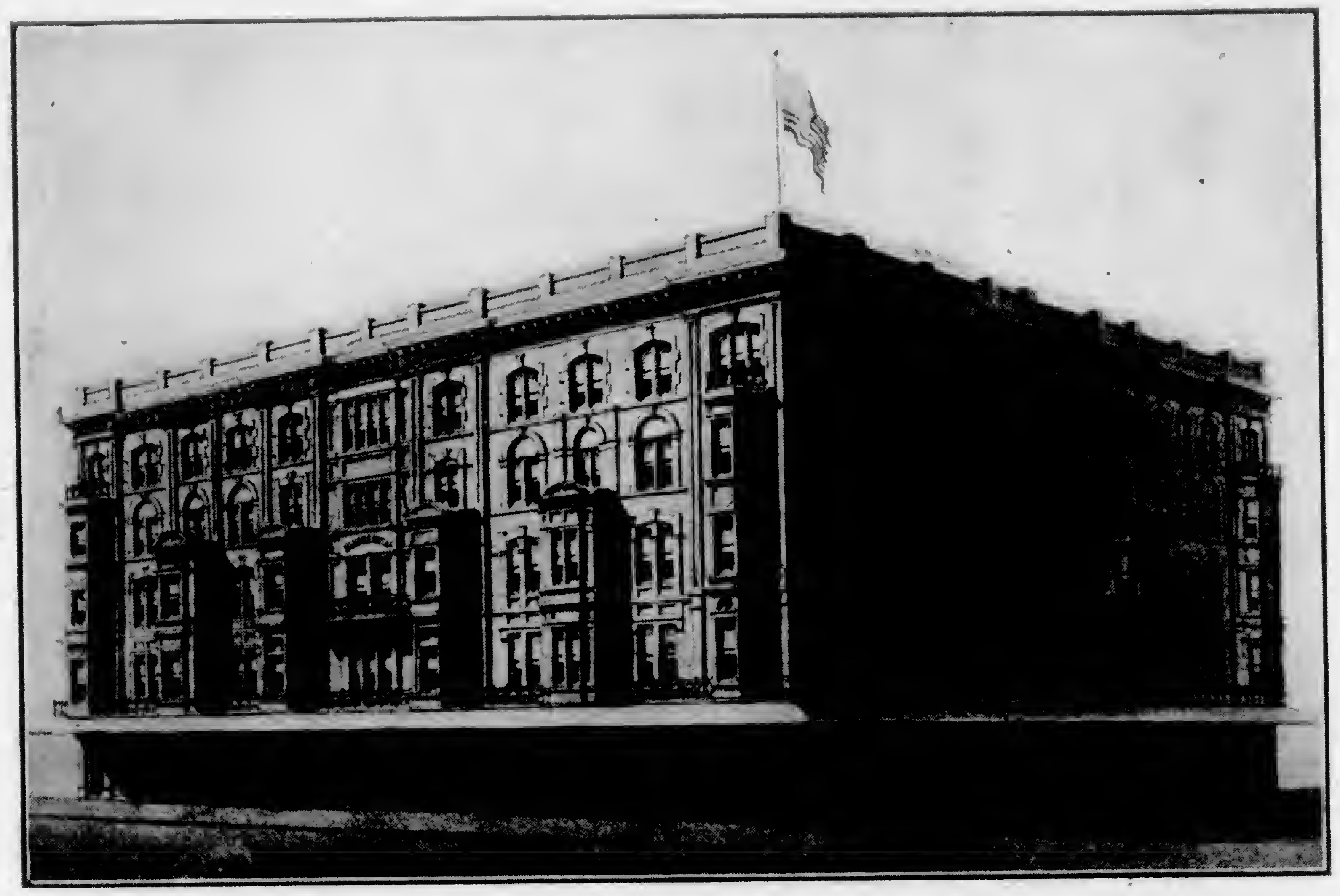
This school has eight recitation rooms and a large assembly room, besides the regular equipment of cloak and hat rooms, principal's office, teachers' rooms, etc.

The Madera jail is well designed and well built, and while small, has all the necessary equipment of a modern bastile.

The Fresno County Hospital is one of Mr. McDougall's latest efforts and has been called by visiting physicians a model of its kind. It is arranged in a series of semi-detached one-story buildings, each containing a large ward for patients and the necessary diet kitchens, toilets, nurses' rooms, etc. All are connected to a central—administration building by enclosed porches, so arranged as to permit of communication from one building to another or to the central administration building, without any loss of time or extra distance traveled.

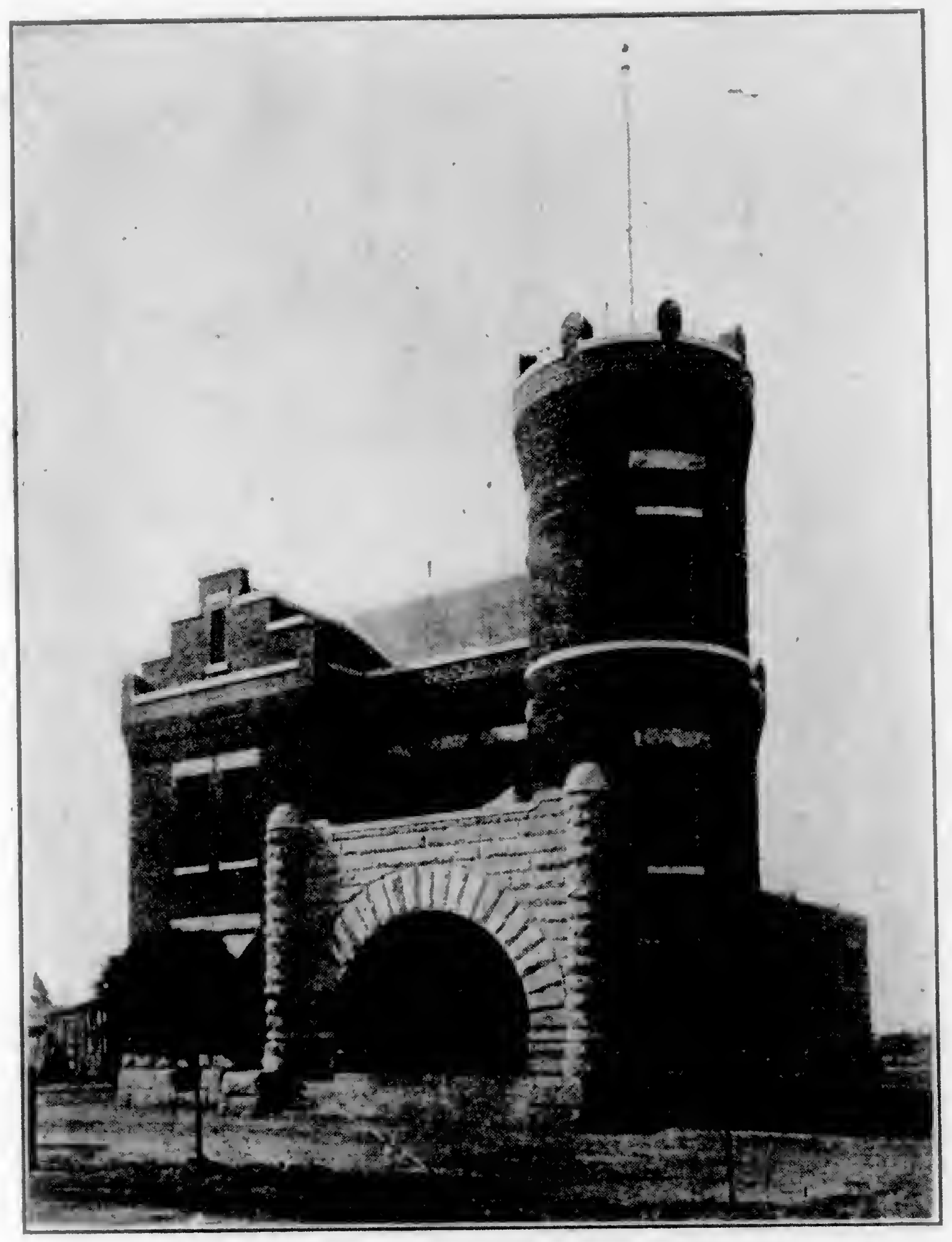
The buildings are of the California Mission style of architecture and built of brick and cement.

The hospital is equipped with its own water service, the tank tower being erected by the Pacific Construction Company of San Francisco, and



New Hughes Hotel, Fresno B J. McDougall, Architect Electrical Work by Clark Steger

Residence of Dr. W. T. Maupin, Fresno H. A. Hansen, Builder



Madera Jail, Built of Brick and Stone
Brickwork by F. J. Craycroft & Son

C. J Lindgren, Contractor
B. J. McDougall, Architect

the boilers, pumps and various other machinery, including the heating plant, being installed by the Russel Vail Engineering Company of Stockton.

The Sequoia hotel is a new acquisition among Fresno's first-class hotels, and is admirably planned and equipped. The building was erected by Mr. Lindgren in the record-breaking time of four months.

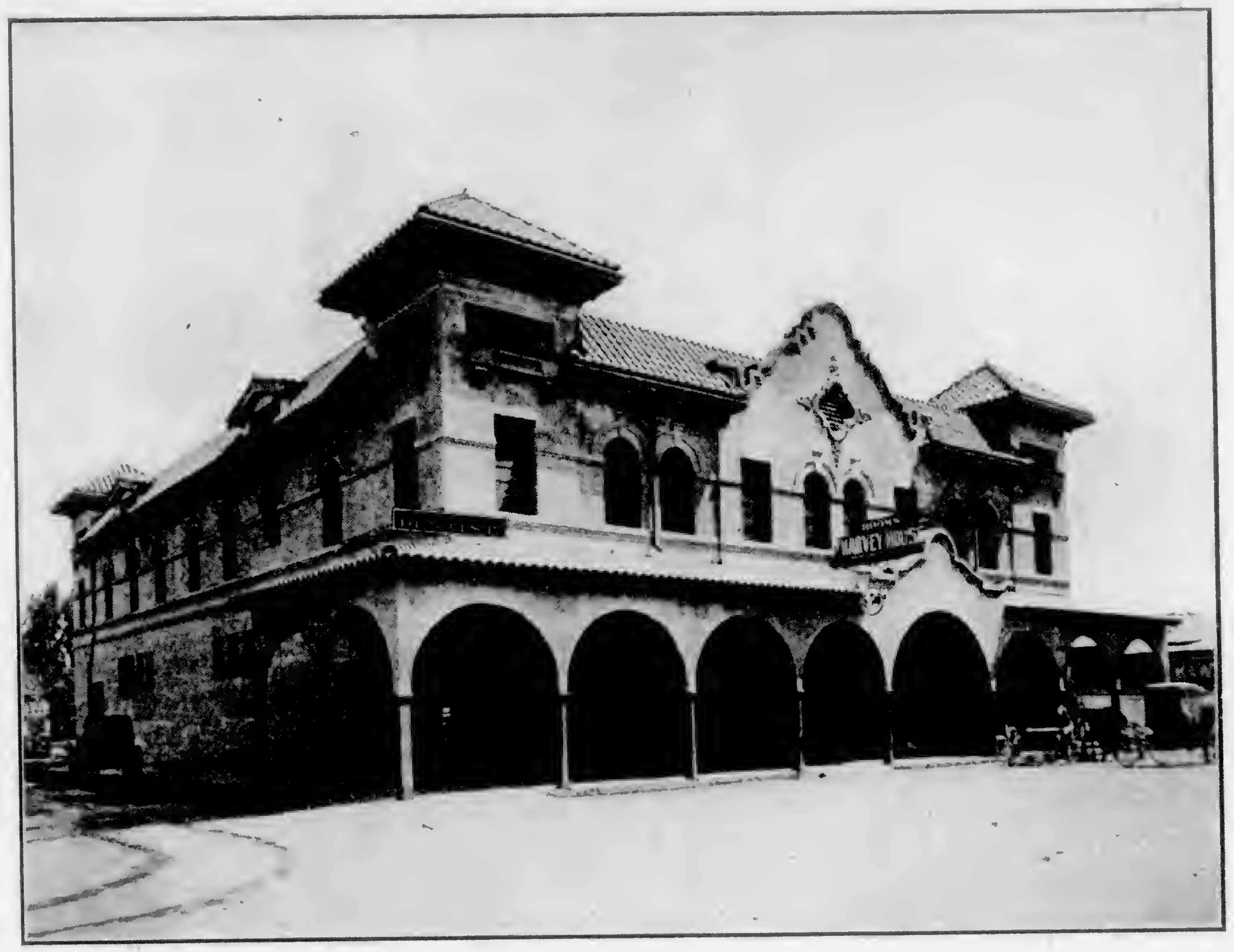
The Washington Grammar School at Fresno is one of the city's finest school buildings, containing twelve class rooms and two large assembly rooms, a principal's office, chemical and physical laboratories, library, and teachers' rooms.

The Chamber of Commerce building was erected by Mr. Lindgren for the Fresno Chamber of Commerce in a small park in Fresno, as a place to house a permanent exhibit of the various products of the county. The building contains a large exhibition room and a secretary's room, besides a meeting room for the executive committee of the Chamber.

The remodelling of the Hughes Hotel at Fresno consists of some very extensive alterations, including a palm court in the center of the building on the ground floor, 50 feet square and 36 feet high, to a glass roof. This will be used as a lounging room for guests of the hotel and will connect directly with the new entrance on Tulare street.

The remodelling also includes two extra stories, and when completed will be one of the most up-to-date hotels in the State.

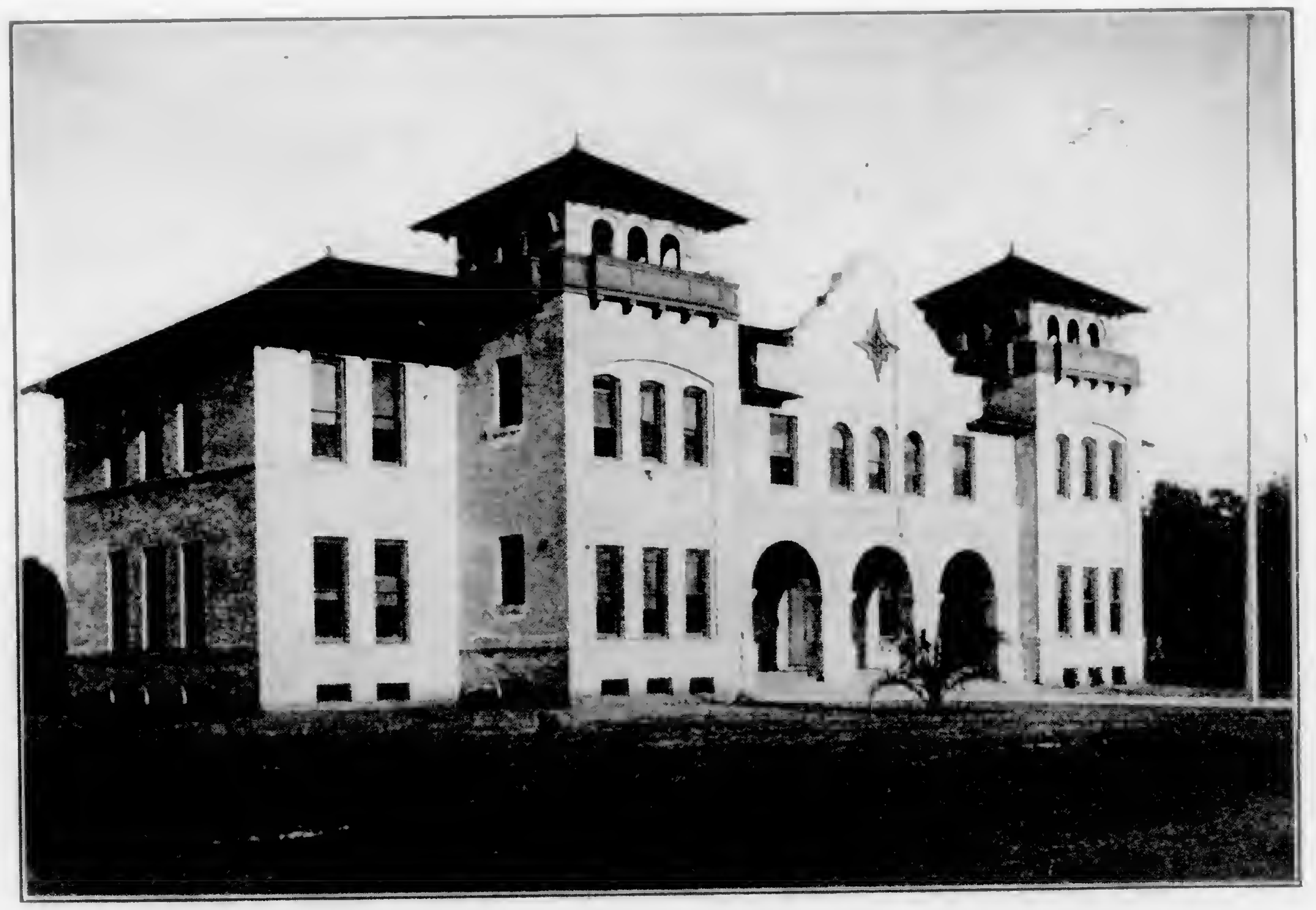
The Patterson Block, on the corner of J and Tulare streets, is a typical office building of the San Joaquin Valley, the lower floor being devoted to stores and the second story arranged for offices in suites.



Plumbing by R. M. & H. Askin

R. E. Hyde Business Block, Visalia

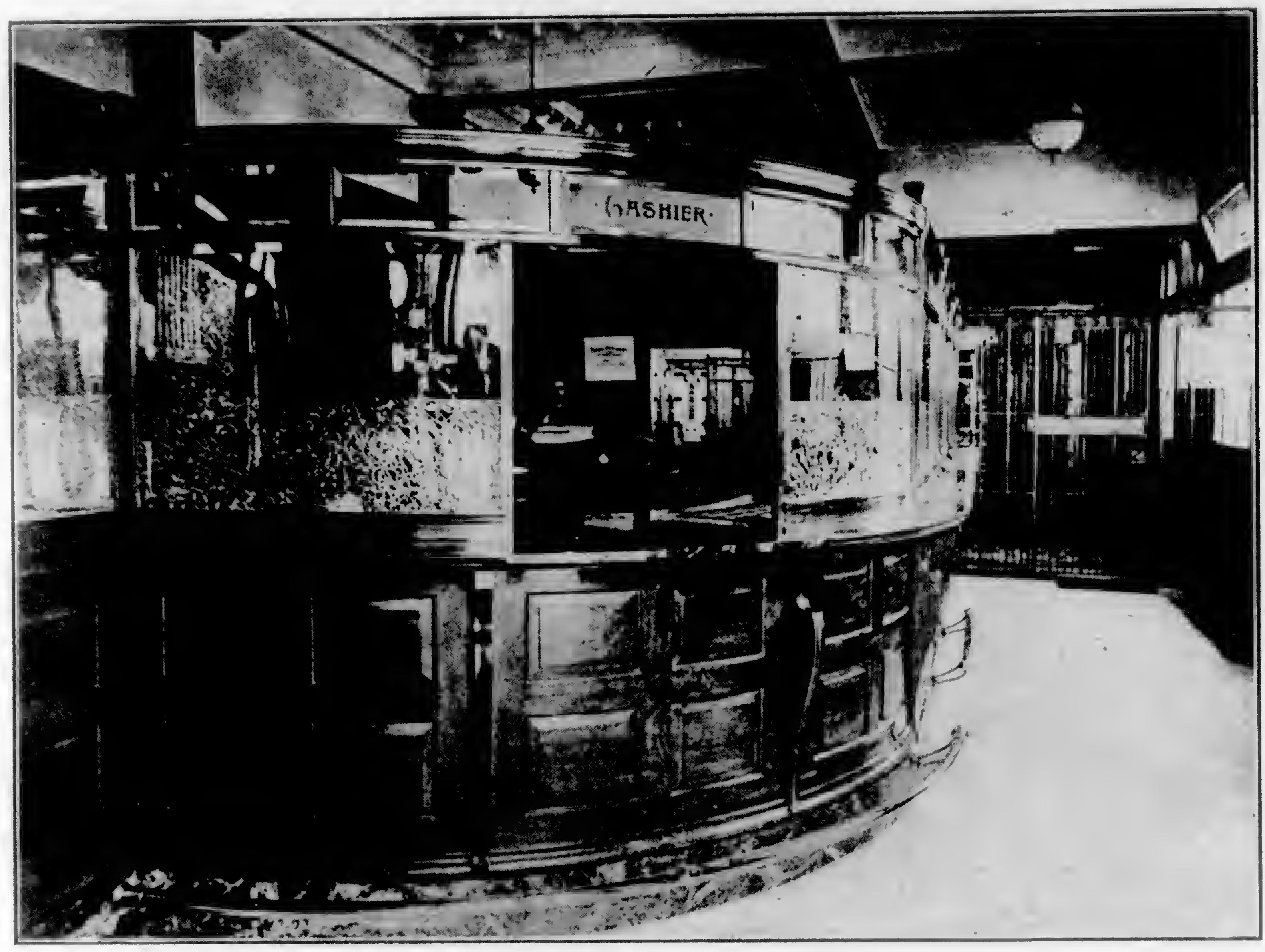
B. G. McDougall, Architect



Painting by Frank Childs

Visalia Grammar School

B. G. McDougall, Architect



Interior of First National Bank, Visalia
Millwork by Spaulding Lumber Co. B. G. McDougall, Architect

Bright Outlook For the San Francisco Architectural Club

By C. E. ROESCH

CLUB LIFE, the result of a prosperous condition in a community, is usually the first to suffer when these conditions become other than normal; this, however, was not the case in the instance of the San Francisco Architectural Club.

Since the hastily called special session on May ninth, permanent quarters have been selected, furnishings purchased and placed in position, the rooms redecorated, and the entire scheme of rehabilitation has been so completely and successfully carried out that when the members entered their new quarters to attend the regular business meeting on Wednesday, June sixth, they were most agreeably surprised at the thoroughness with which the various committees had performed their duties.

Expressions of approval were heard from all present, both as to the artistic arrangement of the interior and the accessibility of the location, 1007 Steiner street, corner Golden Gate avenue.

In view of the great difficulty in securing accommodations of every kind, the committee on "location" was heartily commended on their wise selection.

After the members had voiced their enthusiasm and delight over their new home, the regular order of business was resumed.

Financially the club is in excellent condition, and with a bright prospect of receiving the insurance which was placed with a strong company, and one which fortunately carried but little risk in San Francisco, their affairs are in a most prosperous state. The enrollment is larger than ever, the membership increasing through the arrival of Eastern architects and draughtsmen who have decided to enter the local field, and every indication points toward a most successful career for this organization.

In view of this the dues for the months of April, May and June were suspended.

The local club is affiliated with the Architectural League of America, a national institution, the sister clubs of which have been most generous in offers of assistance, a library consisting of the principal works of interest to engineers and architects having been donated by the St. Louis Architectural Club. This library is to be placed at the disposal of all those interested, irrespective of members.

The Tee Square Club sends a very desirable work on Decoration, in addition to the replenishing of the current files of the various technical journals.

A striking illustration of the way interest is being revived is manifested by the resumption of the various classes conducted before the fire, and the addition of a class in sketching. This class is under the supervision of Mr. A. O. Johnson, a very capable instructor, who also conducts the class in rendering.

The following dates for the beginning of these classes have been decided upon:

Rendering, A. O. Johnson, once a week, beginning Friday, June 15, at 8 P. M. at the clubrooms.

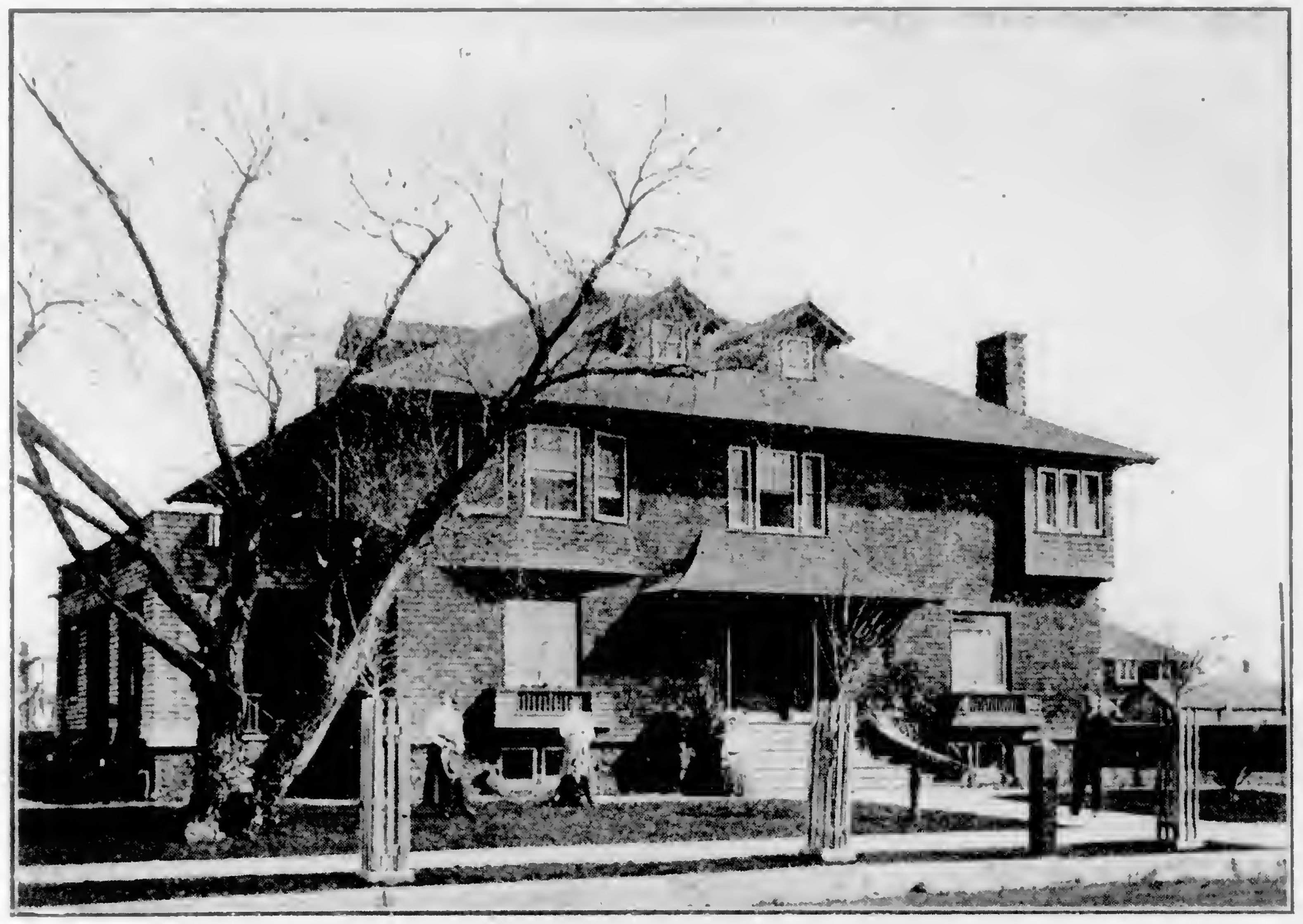
Steel Construction, C. F. Archer, once a week, beginning Monday, June 18th, 8 P. M., at the clubrooms.

Sketching class in water color leaves the clubrooms every Sunday morning at 9 A. M., for outdoor subjects, beginning the 17th inst

These classes are conducted without expense to the members, and are open to all who will take an active part, and show an interest in the work. The benefit to be derived from this instruction is quite apparent.

The following members were appointed a nominating committee to place in office a Secretary and one Director: Messrs. George Wagner, chairman; J. G. Drescher and O. R. Baxter.

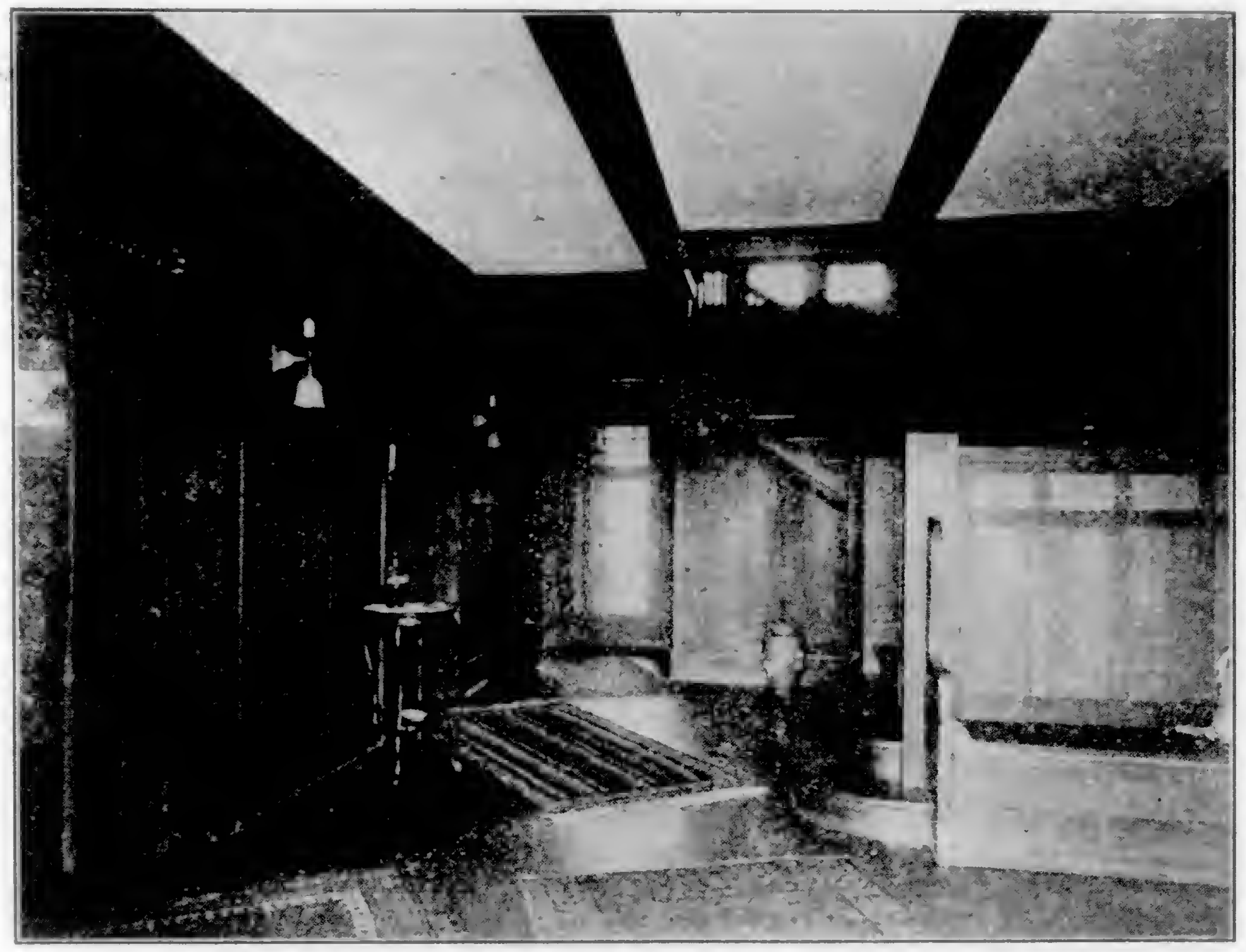
Chamber of Commerce Building, Fresno
Brickwork by F. J. Craycroft & Son
C. J. Lindgren, Contractor
B. G. McDougall, Architect



Residence of Mr. C. J. Lindgren, Fresno

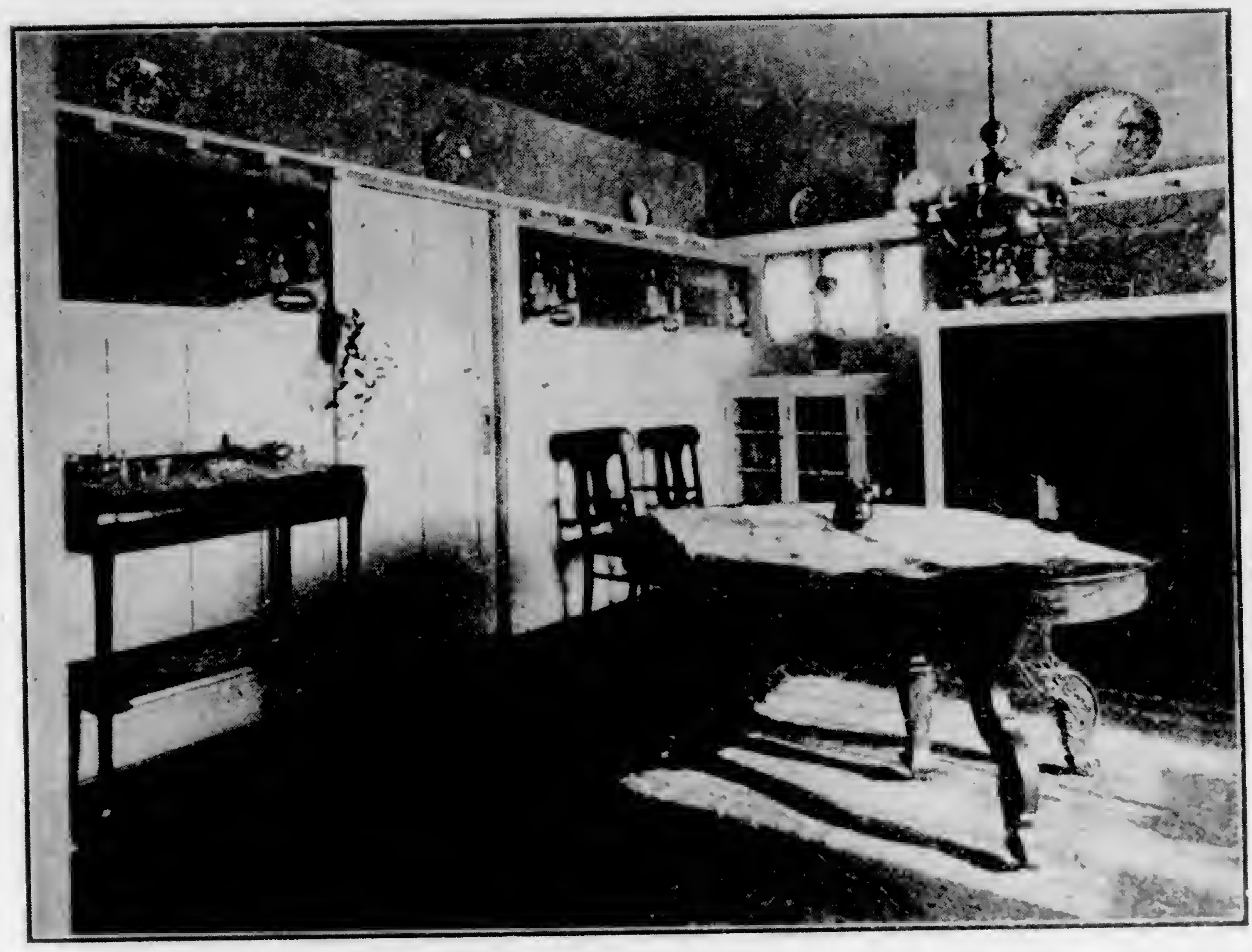
Electrical Work by Clark Steger
Plumbing by Barrett-Hicks Co.

B. G. McDougall, Architect



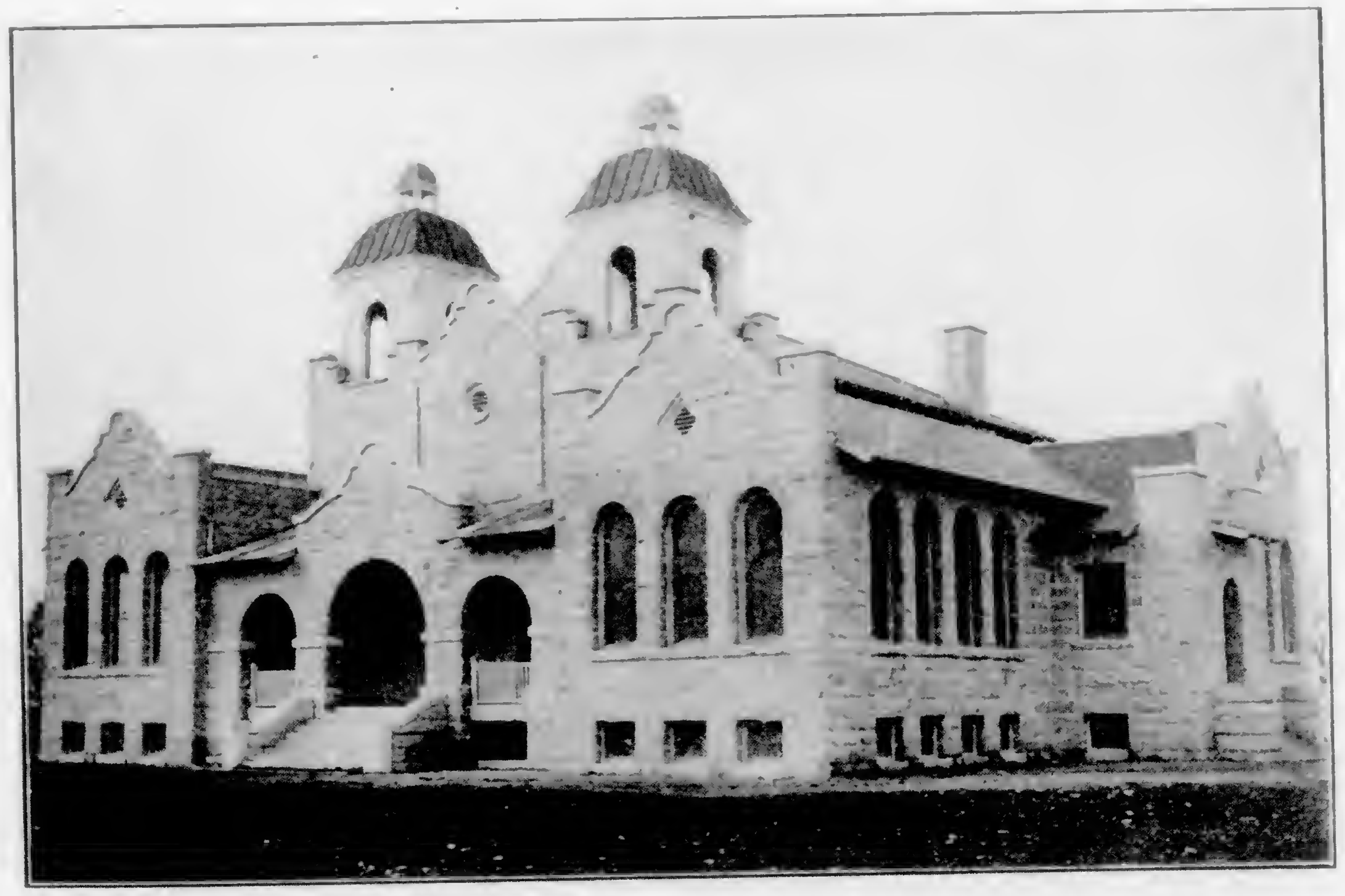
Lower Hall, Residence of Mr. C. J. Lindgren, Fresno

B. G. McDougall, Architect



Dining Room, Residence of Mr. C. J. Lindgren

B. G. McDougall, Architect



Porterville Grammar School

C. J. Lindgren, Contractor

B. G. McDougall, Architect

Inspiring Words From Baltimore

IT IS an ill wind that blows nobody good."

The affliction of the thousands at San Francisco will benefit the architects, the builders, the makers and dealers in building materials and thousands upon thousands of workingmen, yet not a man will be glad.

When the great fire swept over the business section of Baltimore the whole nation sympathized, while the people of the city stood stunned and almost helpless for days. But the disaster of Baltimore is dwarfed to almost insignificance by the appalling calamity that has overtaken the great city at the Golden Gate. In Baltimore millions turned to ash heaps in a day. In San Francisco the property loss will be probably four or five times as great.

In Baltimore not a life was lost and few people were made homeless. In San Francisco the loss of life is heart-rending, 200,000 people, men, women, children and babies were driven from homes into the streets and parks without food, clothing or shelter, while no less than 500 perished in the seething flames or the crumbled ruins of home or magnificent hotels or business structures.

With this striking contrast can we conceive of the crushing force with which this blow has fallen upon the people of San Francisco?

But order is coming out of chaos, the brave hearts of the stricken city are again beating strong and true, and determination to build is the one great plan next to the care of the suffering thousands.

Build! Of course they will build. They are Americans, with the true American courage and indomitable energy, the American faith and American will. As Chicago, Boston, St. Louis, Galveston and Baltimore arose from the devastation stronger, better and more courageous, so will San Francisco rise, and in the upbuilding gain new hope and greater civic interest and purpose.

It has been suggested that the upbuilding will be slow and less costly than before because capitalists will hesitate to invest. This is improbable. Americans are never daunted by disaster. As was said of Dr. Daniel C. Gilman: "He loves difficulties for the pleasure of overcoming them." That is the true spirit, and it will be as manifest in the upbuilding of San Francisco as it has been in thousands of other instances. Already has come a call for architects and builders, and the problem of how best to build to set at naught the earthquake's power is being given serious study by the great building firms of the nation.

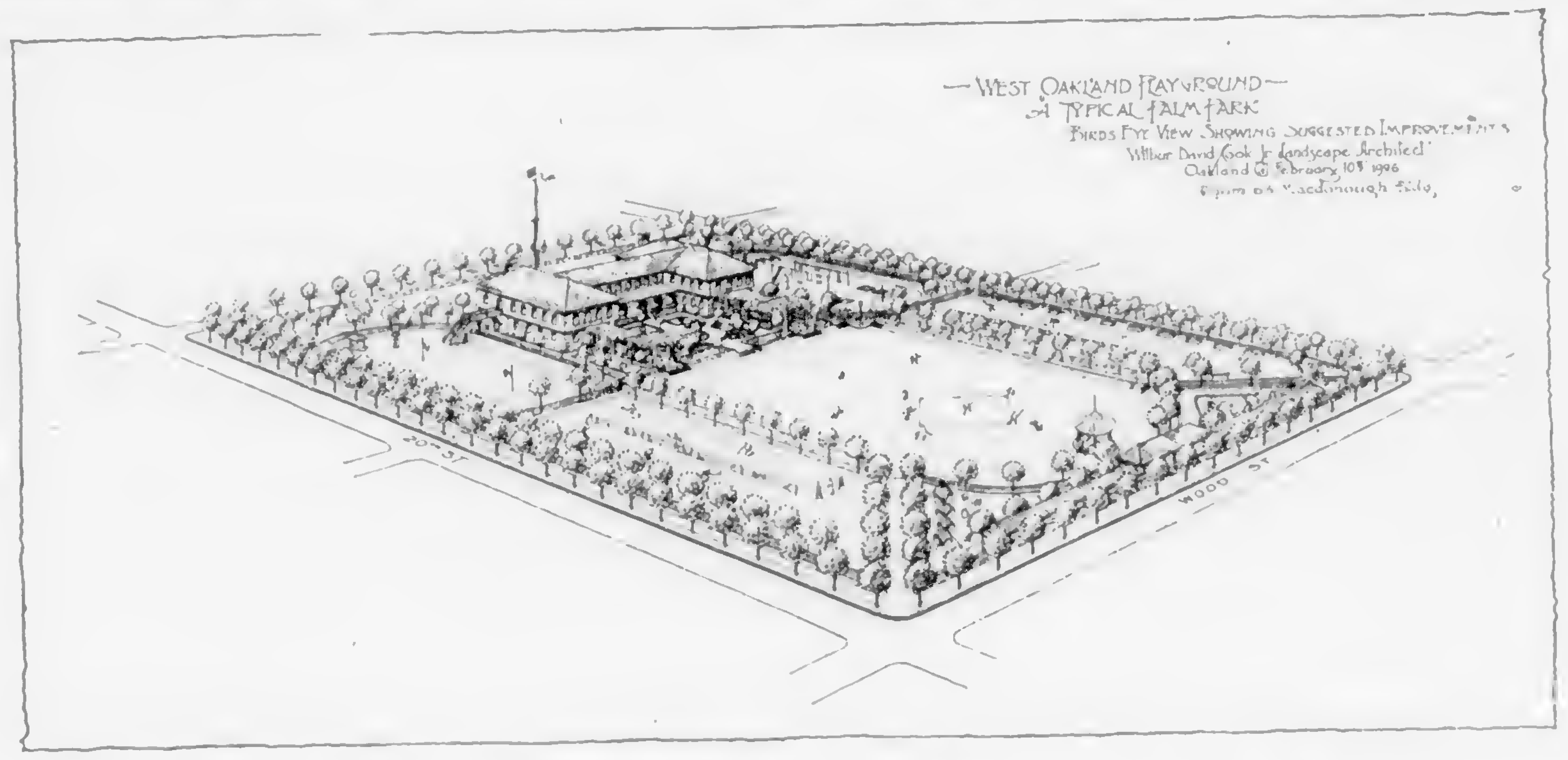
But there is another American trait that is greater than all others, "Faith, hope and charity, and the greatest of these is charity." Americans have faith unsurpassed, hope that is eternal, charity that knows no bounds, knows no creed, that considers not race or color. The cry of the suffering has but to be heard and the sordid in life is forgotten and the rain of charity pours in torrents from o'erflowing purses, the strings of which are loosed by the hands of men and women whose hearts are as tender as those of children. Americans are as vigorous in their charity as in their business life. The marvel of the world in business progress, Americans are also the marvel of the world in extending the helping hand to the afflicted.

"For inasmuch as ye do it unto the least of these, ye do it unto Me."

—Architects' and Builders' Journal of Baltimore.

No better assurance that San Francisco is going to rise from her ashes could be asked than the arrival of such great construction companies as the Fuller Company of Chicago, Thompson-Starrett of New York and Frank B. Gilbreth of New York and Boston.

Landscape Architecture


—West Oakland Playground—
A Typical Palm Park
Birds Eye View Showing Suggested Improvements
Wilbur David Cook Jr Landscape Architect
Oakland Cal February 10th 1906

The West Oakland Playground

By WILBUR DAVID COOK, Jr., Landscape Gardener

IN RESPONSE to a request of Mayor Frank K. Mott I have submitted suggestions and plans for the improvement of the West Oakland playground.

It is proposed to make a Palm Park of this playground, the only one of its kind in the world as far as we know—in character to correspond with the suggested improvements for the Sixteenth-street station.

It is a matter of great importance to any growing city that its entrances should possess some features of such marked individuality as to instantly impress themselves upon the memories of visitors. It is at the city's front door that our impressions are formed, favorable or otherwise, and how can we expect a favorable impression with the existing conditions?

We suggest then that you have at the city's front door and adjoining the transcontinental highway, a type of playground which has proven such a tremendous success in Chicago.

So popular have these playgrounds proved that the city of Chicago has fourteen of them under construction for the benefit of its fortunate and progressive citizens. The attendance at the Chicago parks last year was over seven hundred thousand people attesting their popularity in a substantial manner.

Contrast for a moment the conditions which confronted Chicago with those of Oakland. In the case of the former city, block after block of existing buildings had to be condemned and removed before any park work could be begun. This, too, in thickly built up portions of the city, and while it is quite true that many of the condemned buildings were not architectually beautiful, it was nevertheless an expensive undertaking. In the case of Oakland, she owns the present park site, and the conditions are particularly favorable for the construction of such a playground at the present time.

Given a clean field, then, we would erect a field house on the Spanish order of architecture of rough cast concrete, with a low pitched red tiled roof of liberal overhang, the building to comprise a main building and two ells (one for the women, the other for the men) connected by a general assembly hall on the second floor and by an administration room and a series of colonnades on the first floor.

In the basement of the main building is a large salt water natatorium or swimming tank filled with sea water pumped in and heated to a temperature of 68 degrees fahrenheit. Surrounding this tank dressing rooms, lockers and shower baths will be found. This tank will be open to the general public on alternate days and evenings of the week, i. e. women and girls one day and evening, men and boys the next. An attendant will always be on hand to instruct in the art of swimming. Suitable bathing suits, towels and lockers will be supplied by the city for a nominal fee and all suits will be thoroughly sterilized after use, in the laundry in the basement.

In the administration room just overhead, a lunch counter will be found, this concession having been let by the city to the highest bidder, and the revenue derived therefrom utilized in the payment of attendants' wages.

In the men's ell on this floor is a reception room, in which is kept the current magazines and papers and the playing of various games is allowed, restricting only games of chance or any form of gambling. Here, too, will be found a smoking room. A room is provided for the use of the women on the other end of the building. In it will be held mother's meetings, sewing guilds, etc.; also lectures on the feeding and care of infants. As a matter of fact these rooms will be open all the time for non-sectarian meetings of any kind.

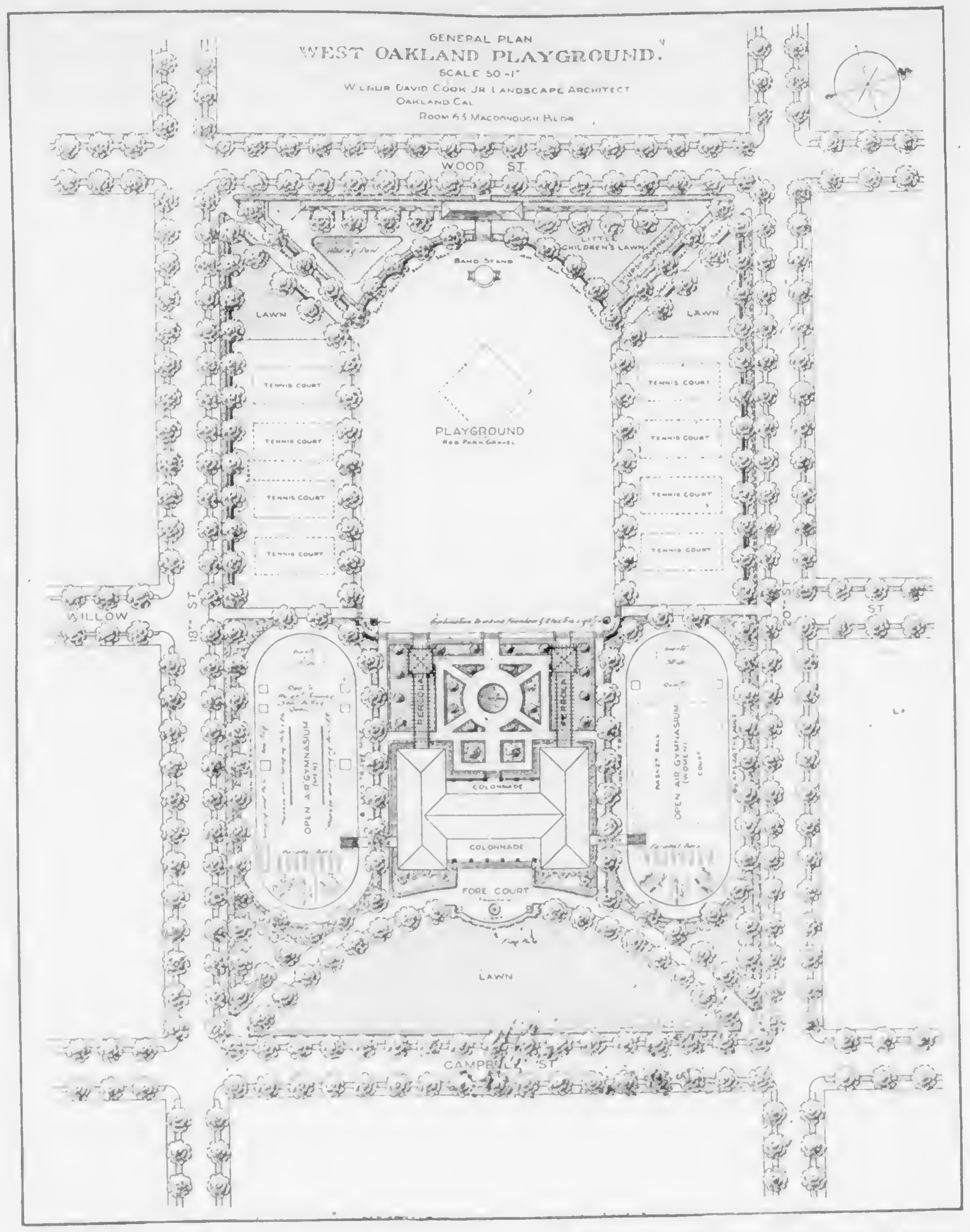
Separate indoor gymnasiums are provided for use in inclement weather and will be found over the respective reception rooms on the second floor. Separate outdoor gymnasiums are also provided for use in pleasant weather and will be referred to later in connection with the other outdoor features of the playground.

A general assembly hall is provided in the central building on the second floor, and is supplied with a stage, upon which illustrated lectures, musical and dramatic entertainments are given by the local talent of the community.

Leading from the reception room on the first floor are vine-clad Pergolas with seats, from which pleasing views of a formal flower court and basin are to be obtained.

Here, too, are well kept gravel walks edged with box, and bay trees set about in profusion and with parti-colored flowers forming a pleasing, restful setting to a rather strenuous playground beyond.

Access to this playground may be had either by the wide central walk or through these pergolas by descending three or four steps, as the playground is sunken to meet the present surface, which is about two feet below the existing street grades. This is a most happy condition, as it will save the city a great deal of money in the way of fill. The other portions of this playground will be brought up to the present street level. A glance at the accompanying plans will make our meaning clear.



General Plan of the West Oakland Playground   Wilbur David Cook, Landscape Architect

The surface of this central playground and the tennis courts will be of red park gravel, which has proved of great value in standing the wear and tear of hard usage and of drying out most rapidly after hard rainfalls. Combination drinking fountains and electric lights are provided for in all parts of the playground. Here, too, will be found a band stand and a ball field, screened from the tennis courts by a permanent wire screen, to be covered with roses or wistaria. Ample seating accomodations are provided for those desiring to watch the various games in progress.

At the end of the central playground is a little children's playground, together with a suitable shelter, with side wings of covered seats backing the sand courts and children's lawn. On the right is a shallow wading pool filled with sea water, in which toy boats can be sailed and the little ones can wade at pleasure. Merry-go-rounds, teeter boards, see-saws, scups and swings will also be found on the children's lawn, also giant's strides. This entire playground is surrounded by a substantial fence and the little ones are safe from harm and are not playing in the streets.

Adjoining the field house at the right and left are the outdoor gymnasiums, supplied with apparatus of a substantial character to withstand the action of the elements. Here will be found pulley weights, horizontal bars, parallel bars, ladders, ropes, swings, trapeze, travelling rings, etc.; also eight lap cinder running track, and a place for shot putting, pole vault, quoits, high jumping, etc. (In Boston and Chicago the running tracks are utilized by candidates for the police force in training.) Toilet accommodations are provided under the steps in the respective gymnasiums, also an emergency gate for the use of attendants in case of injury. Access to these gymnasiums by the general public may be had by passing through the building and out over the bridges across the running tracks. While this may seem a bit round-a-bout, experience has shown it to be the best, as the attendants see and know who is making use of the apparatus and can place the blame for injury to persons or property. The women's gymnasium is similar in character, except that a basket ball court takes the place of the heavier apparatus.

The approach of the field house from the front is by a broad curvilinear path leading from the opposite corners and meeting in a formal forecourt, in the center in which is shown a combination fountain and light, all fountains being of the hygiene bubble type, thus doing away with that familiar menace to health the public drinking cup-and-chain.

The field house will have a pleasing setting of front lawn for color effect and is to be edged along the street front with a closely clipped privet hedge. The use of the Dracena palm is advocated to secure the sub-tropical effect so much admired by visitors. These trees will do well here if provided with tree pits filled in with good loam five or six feet deep.

The objection is often raised to a playground of this description by people unfamiliar with park conditions, that it is too fine for a manufacturing district. This objection does not hold good, however, as has been demonstrated time and time again by fact, not theory, as in the case of Chicago. A playground of this kind has been found to be of great value to manufacturing districts.

The employees of the various factories in the immediate neighborhood cut short their noon hour to make use of the apparatus and games to be found here and to make use of the swimming tank after the day's work is done. It is an interesting fact to note that the attendance to the Natatorium in McKinley park in Chicago from June 4th to October 2nd was 121,625 persons, proving the popularity of this one feature in a park of only thirty-six acres. It is also well to bear in mind the value of such an improvement to the railroad companies, both steam and electric. They should be called upon to assist in an improvement of this character, and once they understand its value you can rest assured of their hearty co-operation. In closing, I will cite one notable example, which can be verified by any one interested.

In 1896 the Metropolitan Park Commission of Massachusetts took possession of what is now known as the Revere Beach reservation, a strip of seashore property, about six miles out of Boston. Paralleling this beach property there were two lines of steam railroads, one the Boston and Maine, Eastern Division, and the other the Boston Revere Beach and Lynn, locally known as the Narrow Gauge. This latter road had the advantage of adjoining the beach, and it is this road that we are especially interested in. It had had a precarious existence up to this time, and its stock was listed at $55 per share on the market, with few takers, so that when the Commission took their location by right of eminent domain and moved the road bodily two hundred feet back from the beach it was the feeling that the road's doom was sealed.

The next move of the Commission was to condemn and remove all existing buildings between the railroad and mean low water, and to erect midway of the beach a State bath-house. Note the effect during the summer of 1905.

"It is not uncommon on hot Sundays for one hundred thousand people to seek the North Shore (Revere Beach), via the Narrow Gauge road, the Boston and Main, Eastern Division, and by the electric cars, and for as many more to go to Nantasket and Nahant." The minimum fare is ten cents a head (round trip), that is to Revere.

Now this is where the railroad people are interested. The stock of the Boston, Revere Beach and Lynn road jumped from $55 per share to $155, and is considered today a gilt edge proposition. So much for the practical demonstration of the value of *one* municipal improvement upon railroad properties. We have not mentioned the effect it had upon the electric roads simply because our attention was confined to this one particular railroad.

It seems a pity that Oakland has not taken steps before this to secure at least one or more of these small playgrounds. The older cities are awake to the fact that they are not luxuries but absolute necessities and that they can be made a source of revenue to the city. Such a playground can be constructed at a cost of about five cents per capita.

Our recent great catastrophe has fully proved the value of numerous open spaces. While a playground of this kind is not a Golden Gate Park and cannot offer us either in area or plantations as great a variety of effect, it can afford us an orderly, compact, convenient arrangement for the enjoyment of its various features, and above all it is accessible to many tired mothers and babies who are utterly debarred from going to Golden Gate Park, both on account of expense and the amount of time consumed in coming and going, as well as the uncertainty of climatic conditions. It has the added advantage of keeping what money is spent right here in Oakland, where it belongs, and we still have the Golden Gate Park to fall back on.

San Francisco—The City Beautiful

By DANIEL H. BURNHAM

WITHIN six months the new San Francisco with its wide driveways and handsome buildings will be well advanced, and in a year's time it will not be easy to find a trace of devastation.

The pride of San Francisco citizens, it seems to me, has been touched by the disaster and even the poorer people who lost their homes will soon build again on a more substantial and artistic scale.

In regard to the plans of the committee for the beautification of the new city, my views were chiefly desired along the line of modifications or extensions in the plans that I suggested for the streets and parks. I was asked for suggestions also as to public buildings, and recommended that they all be made strictly fireproof.

The new city will radiate from the City Hall. One of the beneficial effects of the earthquake was the destruction of the old City Hall, an incongruous structure that could not be made to conform to any possible system of plans for the beautification of the city.

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Heating, Lighting and Electrical Work

Electricity Not a Factor In the Recent Disaster

By GEORGE J. WELLINGTON, C. E.

COMPLYING wth your request for a report upon the recent conflagration, I have purposely avoided one that is technical and have reviewed the subject from a practical standpoint. The primary cause of the late disastrous fire is attributable to the earthquake of April 18th.

A glance at the city from a point of eminence, shortly after the temblor had subsided, at once disclosed the fact that San Francisco was doomed.

Columns of smoke ascending from fires at many different points made apparent a condition that no fire department in existence could cope with on account of the impossibility of assembling sufficient apparatus at each fire to control it, particularly with little or no pressure in the hydrant mains.

The fires were started from many causes, prominent among which were combustion in drug stores arising from chemical combinations through breaking of receptacles, and the overturning and bursting of jars and tanks containing phosphorus.

Improperly constructed brick chimneys, inflammable materials coming in contact with open lights, and overturned oil lamps and stoves contributed extensively. Electricity, as far as can be learned, was not a factor, as the disabling of generating stations and the prompt throwing of switches by competent attendants, as well as the operation of automatic devices, placed this fruitful source of fire out of commission.

Lack of water, due to various causes, combined with the fatal accident to Fire Chief Sullivan, deprived the department of its most valuable resources.

Many fires in the residence sections were controlled and extinguished, but those in the business districts soon developed into conflagrations too fierce for the department to cope with, even had the water supply been efficient.

In the earlier stages no air was stirring, excepting draughts created by the flames, while during the afternoon of the first day a strong breeze carried the flames in an easterly direction, and fanned their fury to an extent that radiated the heat across streets to windward.

Dynamiting in the business districts, in attempts to stay the progress of the fires, resulted practically only in the breaking of all windows in the neighborhood.

The bay and broad thoroughfares, in addition to water from a private pumping plant in the Mission District, finally stayed the progress of the flames after their almost total destruction of buildings containing about three-fourths of San Francisco's wealth and population.

Unprotected openings of brick buildings, improperly hung and uncared for metal-clad shutters, ineffective rolling and ordinary iron shutters, were all conspicuous by their weaknesses. Exposed sides of hollow tile fireproofing again cracked away; concealed piping again forced fireproofing away from steel members that it was intended to protect; metal lath and plaster partitions again failed, and unprotected steel was warped and distorted, permitting floors to fall. Tall brick buildings of joisted interiors radiated heat followed by fire to wooden cornices and window frame.

Cast-iron columns stood the test because there was no water to crack them. Stone fronts disintegrated and fireproof buildings were left in thoroughly damaged condition by their inflammable contents.

Fire walls surrounding large areas fell after being deprived of their wooden supports.

In fact, everything that has been predicted by Fire Engineers occurred. The bigotry of architects, cupidity of contractors and penuriousness of owners have laid the Metropolis of the Pacific low. The work of intelligent architects came to naught against the creations of incompetent ones. The owners of well-constructed buildings were burned out by their criminally careless neighbors.

In many instances building talent was not engaged on account of its ability to construct permanently and well, but rather for its shrewdness in erecting structures that would earn greatest return for sums invested. Competition in this respect has led to the use of inferior materials and the evasion of building laws and Underwriters' recommendations. San Francisco possesses building laws in plenty which require enforcement rather than alteration. A valuable addition to the present ordinances would by one similar to that in force in some European countries which penalizes owners for fires that escape from their buildings, affording protection to men disposed to build well.

Great stress is being laid upon the condition of one office building that was burned out only to the fifth floor. Careful investigation discloses that very low and substantial buildings surrounded, and therefore it was not subjected to the intense heat and flames that attacked others of Class A construction.

Wooden window-frames in this building played their part, and while the interior wood finish was metal-clad, the glass in doors was destroyed, and hinges, held by screws driven through the metal into the wooden backing, gave way.

Another building with wire-glass windows in the business district stands practically intact by reason of its private water supply. This building was also not exposed to the intense heat that prevailed in other sections.

The integrity of brick fire walls built before the days of advanced business ideas was not disturbed by the earthquake, demonstrating that Class A buildings are not absolutely necessary to prevent spread of fires if proper and honest construction is practiced. Proper consideration should be given each class or fireproofings and retardments, as both have their limitations. Much will depend upon pride and the willingness of owners to safeguard their buildings.

The term "safe fire risk" does not necessarily mean a class of buildings that will inconvenience the conduct of business or bankrupt the owner with its cost.

On account of liability of rupture to public water mains by earthquake, independent pumping systems in each building or group of buildings will be the solution of perfect private fire protection. For fire department use, a circulating salt-water system with a number of pumping stations should be provided.

As a provision against interruption of service by earthquakes, reinforced concrete cisterns with flexible linings, to provide suction for engines, should be built upon rock or pile foundations.

Whatever portions of this article may appear critical are expressed by one born and bred in San Francisco, with a desire if possible to assist in rebuilding a city which will be not only beautiful but safe.

Brickmakers' Opposition to Re-enforced Concrete

PREPOSTEROUS, insincere and selfish objections to re-enforced concrete are being urged by agents of the brick trust. There will be a very active demand for bricks in the next three or four years, but the local combination of brickmakers is jealous of its monopoly and afraid of the possible competition of re-enforced concrete.

Brick construction did not stand the earthquake shock very gloriously. Brick buildings suffered the greatest damage. The experience of April 18 teaches that brick is the most dangerous sort of construction in earthquakes. Nor did the brick buildings stand the fire much better than they stood the earthquake, as the burned territory testifies.

Re-enforced concrete, in the opinion of architects, engineers and building contractors, is vastly superior to brick, and is practically as good as steel in resisting earthquake and fire. There is no better building material than re-enforced concrete. Although designated as "Class B," the classification does not imply inferiority to Class A structures, but implies merely a difference of construction.

Re-enforced concrete has been tried and proved in Eastern cities, and its merits are recognized. The brick interests in the past have managed to have the building ordinances so written that re-enforced concrete was not permitted in this city. The time has come, however, when the city's need is stronger than the political influence of any special interest. San Francisco will not submit to any retardation of her growth for the sake of the allied brick manufacturers.

The building trades are not opposing re-enforced concrete; at least so says P. H. McCarthy. All the opposition comes from those whose business it is to sell bricks. There does not seem to be any effort on the part of these opponents to present a rational argument against re-enforced concrete. But they are endeavoring to have prohibitive conditions written into the proposed ordinance. They want the law to require that the walls of re-enforced concrete be of an unnecessary and costly thickness. Such a condition would make a building of re-enforced concrete costlier than one of steel, and would, of course, be just as effective in the interest of the brick manfacturers as a flat prohibition of re-enforced concrete.

Both Marsden Manson and James D. Phelan are strong advocates of re-enforced concrete. Mr. Manson calls it a nearly ideal construction, and Mr. Phelan declares that he is done with bricks. Three of his buildings in San Jose, constructed of brick, were knocked down by the earthquake, and he intends to rebuild them in re-enforced concrete. Many other men are of the same mind, and they demand that their interests shall not be sacrificed to those of the brickmakers.—San Francisco Bulletin.

New Designs in Wall Paper

WALL paper, which always is thought of as a minor in the matter of house furnishings, is, in fact, one of the most important details in beautifying the home. No matter if the carpet, furniture and drapery are in perfect harmony, let the wall paper be contrary in color and design and the effect of the room is spoiled.

Every spring, when the housewife is busy with pan, broom and dusting cloth and the house is undergoing a thorough renovating, the paper hanger is in his glory. The designs this spring are as many and varied as the prices. As one looks over the vast array of designs for each particular room it would be hard to decide which is the prettiest pattern.

For the parlor and sitting room the panel and light colors in imported goods promise to be the favorite design; for the hall and library, the new crown effect; for the bed room, the stripe and floral work; and for the kitchen, the granite and varnished tile paper.

One pretty design in parlor paper is a dark green panel effect, the center of each strip being decorated with a landscape scene. These strips are to be used alternately. The border especially is noticeable, the scenery of the border being put on alternately, like the wall paper, making it appear as if it were one continuous strip.

Another unique design of the parlor paper is a floral pattern in links on a dark brown background. The paper for the ceiling is the new tufted patterns, which, when it is put on the wall, has the appearance of a tufted cushion. A beautiful pattern in small roses also is shown, though the floral design seldom is seen.

The crown effect is used generally in halls and libraries. This paper is put on in three pieces, the top piece having an effect of the crown. A beautiful design of this sort was seen in dark crimson. The crown was outlined with a pale gold strip.

The oriental styles also find great favor in many of the hall and library papers. One pattern of this sort was composed of several colors and the unique figures were outlined with a dull red. This sold as high as $3 a roll.

It seems as if all the new and dainty designs in floral colors are reserved for the bed room. Every flower imaginable is brought out in all of its dainty colors. One extremely beautiful design was a violet pattern which sold for 15 cents a roll. The flowers were arranged in strips along the paper and the border consisted of huge bouquets of the same flowers. The light ceiling paper went with this design.

Pink is greatly favored in bed room paper and this was carried out in a design of apple blossoms. The flowers are generally arranged in strips, as the stripe and the floral design are the favorite pattern. The prices of the floral paper range from 25 cents up to $4.00.

Fruit and trellies work for the dining room is at the same time unique and beautiful. One extremely handsome and also expensive design was seen in one of the Springfield shops. The background was of dark green trellis work, purple grapes twining among the foliage. When the paper was put on, the room had the appearance of an arbor, with pillars placed at the corners of the room. This sold for $1.75 a roll.

Of course, there are some pretty patterns that are not nearly so expensive and are equally pleasing. One dainty patterns, which sold for 40 cents a roll, had a dark background of blue. Small bunches of flowers and fruit were scattered at intervals along the paper and the border was outlined with dull gold. Still another design was shown in dark red, in which the fruit was small cherries.

Among the Architects

Information contained in this publication is gathered from the most reliable sources accessible, but to make it absolutely accurate the publishers urge the co-operation of the members of the profession

HUMBOLDT BUILDING OF CONCRETE.

No time is being lost in the erection of the New Humboldt Savings Bank building at Fourth and Market streets which was planned before the fire. The bank officials have instructed the architects, Meyer & O'Brien, to proceed with the building at once, and they, in turn, have passed the orders to the Lindgren-Hicks Company, who have contracted to put up the building. The only change in the original plans is the substitution of concrete for brick. The building will be eighteen stories high, of steel, concrete and terra cotta. The estimated cost is $500,000. The foundations are now being prepared.

MUTUAL SAVINGS BANK BUILDING.

No time is to be lost in putting the Mutual Savings Bank Building at the gore of Market and Kearney streets into condition for occupancy. Architect William Curlett is now busy on the plans and it is his intention to have a down town office in the bank building in another week so he can personally oversee the work. Mahoney Brothers have been given the contract to get the building in shape and they have a big force of men at work. The building stood both the fire and earthquake remarkably well and the architect is of the opinion that in five or six months the various offices will again be ready for occupancy.

Oakland Bank Building.

Oakland is to have a handsome Class A building from plans now being prepared by Architect C. W. Dickey of the Macdonough Building, Oakland. The structure is to be built at the corner of Twelfth and Broadway and will cost close to $350,000. The exterior will be of pressed brick with granite base and elaborate terra cotta trimmings. There will be eighty-five offices. The ground floor will be occupied by the Oakland Bank of Savings, which institution is to own the building. The interior of the banking rooms will be elaborate with marble and scagliola floors and walls. There will be two high speed elevators.

Contract for Lindgren Hicks.

From plans by Architects Oliver and Foulkes, Syndicate Building, Oakland, the John Breuner Company will at once begin the erection of a six story loft building at the corner of Thirteenth and Franklin streets, Oakland. The structure will be of reinforced concrete faced with brick and terra cotta. The contract for its erection has been given to the Lindgren Hicks Company for $70,000.

To Build Temporary Hotel.

Architects Bliss & Faville have moved their offices to the St. Francis Hotel, where they will be better able to superintend the reconstruction of the big hostelry and at the same time take charge of the erection of a temporary hotel building. The need of first-class accommodations for commercial men is strongly felt, and it is to supply this want that the St. Francis Hotel management has determined to arrange for temporary accommodations until the permanent structure can be finished.

Concrete Warehouse.

A reinforced concrete warehouse is to be constructed on East street, between Mission and Howard streets, by the East Side Improvement Company from plans prepared by Cunningham & Politeo. It was originally planned to make the building of brick, but since the earthquake and fire it was decided to use concrete. The building will be five stories. Piles are now being driven for the structure.

Big Contract Let.

The Fuller Construction Company has been given the contract for the erection of the new McGee building, next to the Mutual Savings Bank building, and work will be started almost immediately. The building is to be Class "A", of steel, with reinforced concrete floors, and will cost about $330,000. It will be twelve stories high.

Architects Lose Drawings.

The San Francisco architects shared with others the misfortunes of the fire, many of them losing all the work of their lifetime. John Galen Howard, the supervising architect of the University of California, lost all the drawings in his San Francisco office, about all the work he had done during his life.

Clinton Day lost thirty years' work, all that he had done since beginning the profession. Albert Pissis also lost all of his drawings. He was ill at the time of the fire. Among the other heavy losers are Frank Van Trees and Reid Bros., the latter having offices in the dome of the Call building.

Despite their losses, every architect in San Francisco that we know of has resumed business and all will do their full share toward the rebuilding of the city.

Personal Mention.

Charles E. Hodges, resident architect at Stanford University, has resigned and will return to his home in London, England. Mr. Hodges' work in Palo Alto has been subjected to considerable unjust criticism by the daily press. His determination to leave the university under such circumstances is regretted exceedingly by the members of the profession. Mr. Hodges was conscientious in his work and took great pride in planning and superintending the construction of some of the great buildings at Palo Alto. Mr. Hodges expects to return to America in six months and will open an office and live in San Francisco.

John Galen Howard, architect, has associated himself with John D Galloway, the well known structural engineer, and offices have been established on the ninth floor of the Atlas Building, 604 Mission street.

THE BUILDING RECORD.

Temporary and Permanent Structures Planned by San Francisco Architects.

Six story office building, Kearney and California streets, San Francisco.

Architects—O'Brien & Werner.

Owner—Louis Friedman.

Cost—$60,000.

The building will be 50x51 feet and will be of concrete and brick and will contain offices and stores.

Five story Class A building, East side of Second street, San Francisco.

Owners—J. G. Barker, C. E. Knickerbecker and H. R. Bostwich.

Cost—$150,000.

Architect—John Cotton Pelton.

The building will be five stories, steel skeleton and reinforced concrete floors, with metal doors and sashes.

Cafe Building, Ellis street, near Fillmore, San Francisco.

Architect—Charles Pfaff & Co.

Owner—H. Becker of Cafe Odeon.

Cost—$12,000.

The building will be in the style of the German Renaissance and will be of stucco work. There will be a ladies' parlor, grill and club rooms.

Two story frame building, Southwest corner of Golden Gate avenue and Van Ness.

Architect—T. Patterson Ross, Bush and Laguna streets, San Francisco.

Owner—St. Andrews Improvement Co., J. S. Webster, president.

Cost—$10,000.

The contract for this building, which will be a permanent structure and will contain one store and ten offices, has been let to A. H. Wilhelm.

Three story brick building, West side of Fremont street, San Francisco.

Architect—T. Patterson Ross.

Owner—Joseph Estate.

Cost—$30,000.

Plans for this building are now being made and will be ready for figures in a few days.

Apartment House, Northeast corner of Polk and Eddy streets, San Francisco.

Architect—T. Patterson Ross.

Owner—O. D. Baldwin.

Cost—$50,000.

The building will be of brick, four stories and will contain stores on the ground floor and three-room apartments above. There will be a marble vestibule and galvanized iron cornices.

History Building, Southeast side of Market street, between Third and Fourth street, San Francisco.

Architects—Cunningham & Politeo.

Owner—H. H. and Matilda S. Bancroft.

Cost—$200,000.

Bids are now being taken for this building which was described in this Bulletin three weeks ago. The structure will be ten stories, steel frame, concrete walls and pressed brick and terra cotta front.

Newspaper building, Market street, between Third and Fourth streets, San Francisco.

Architects—Meyer & O'Brien.

Owner—R. A. Crothers, proprietor the Bulletin.

Cost—$70,000.

The building will be four stories, modern construction and will be for the exclusive use of the Bulletin newspaper.

Three story building, East street, between Mission and Market streets, San Francisco.

Owner—Pabst Brewing Company (J. M. Wilkins and W. Neumann, Pacific Coast agents).

Cost—$50,000.

The Pabst Company has secured a 25-years lease of a lot 45x137 feet on which will be erected at once a substantial three-story brick building.

Store and office building, Geary and Powell streets, San Francisco.

Cost—$10,000.

Owner—Henry P. Sonntag.

Application for a permit to erect this building to be two stories, has been filed with the Board of Public Works; also an application to build an $8,000 structure at Bryant and Eighteenth streets by M. Fisher & Co.

Temporary building, Van Ness avenue and Turk street, San Francisco.

Architect—W. C. Mahoney.

Owner—A. B. Smith Furniture Co.

Cost—$12,000.

This structure will be 50x100 feet and one story. Work is already under way.

Church, Taylor street, near Lombard, San Francisco.

Architects and contractors—Beasley & Beasley.

Owner—St. Peters' Episcopal Church, Rev. William Bours, rector.

Cost—$14,000.

The building will be a frame structure on concrete foundations, with shingled roof and beam ceilings.

Telephone building, New Montgomery street, near Howard, San Francisco.

Architect—A. A. Cantin.

Owner—Pacific States Telephone Company.

Cost—$300,000.

This building will be Class A with foundations and floors of reinforced concrete. The exterior will be of pressed brick, terra cotta and copper with metal sashes and wired glass windows. The building is to be finished in 12 months.

Reinforced concrete building.

Architect—Sylvain Schnaittacher, 1725 Post street.

Owner—Moses Guntz.

Cost—$75,000.

The building will be built on Mission street and will be six stories.

Flats, Mason and Union streets, San Francisco.

Architects—Charles Pfaff, 1153 O'Farrell street, San Francisco.

Owner—Philip de Martini.

Cost—$50,000.

There will be fourteen flats. The building will be four and five stories, of concrete and galvanized iron.

Ten Story Class A Building, Bush and Kearney streets, San Francisco.

Architect—Charles Pfaff.

Owner—W. Friedman.

Cost—$180,000.

Plans have been accepted and contractors are figuring. The frame will be of steel and the outer material will be of stone and brick.

Concrete Building, Second and Minna street, San Francisco.

Architect—Ralph Warner Hart.

Owner—Morton L. Cook.

Cost—$50,000.

The building will be four stories, lot 50x100 feet and will be constructed of re-inforced concrete faced with pressed brick. There will be two elevators.

Store Building, South First street, San Jose.

Architects—Wolf & McKenzie, San Jose.

Owner—O. A Hale.

Cost—$25,000.

The building will be of reinforced concrete, galvanized iron, plate and prism glass and two stories high.

Office Building, Bush and Kearney streets, San Francisco.

Architect—W. H. Weeks, San Francisco and Watsonville.

Owner—F. A. Hihn.

Cost—$350,000.

The building will be 12 stories, Class A, with stone and reinforced concrete walls. The interior will be furnished in metal, including window casings, and the floors will be of marble and the cornices will be of ornamental copper.

Four Story Building—First and Folsom streets, San Francisco.

Owner—Henry E. Bothin.

Architect—Frank Van Trees.

Cost—$50,000.

This building will be four stories and will be the first of a dozen or more substantial structures which Mr. Bothin will build to replace burned structures. Mr. Bothin is head of the Judson Iron Works.

Warehouse, Battery, near Jackson street, San Francisco.

Architects—Sutton & Weeks, 2217 Bush street, San Francisco.

Owner—O. W. Nordwell.

Cost—$120,000.

The building will be six stories high, mill construction and of wood and brick.

Lodging House, Third and Tehama streets, San Francisco.

Architects—Sutton & Weeks.

Owner—Rolkin and Sharp.

Cost—$100,000.

The building will be Class "C", four stories and brick.

Bare Bros. are to erect a temporary building to cost $10,000 at the corner of Polk and Eddy streets.

Six story and Basement Office Building, Bush street and Clara Lane, San Francisco.

Architect—G. A. Dodge, Fillmore street, San Francisco.

Owner—Frank H. Burke, of Madison & Burke.

Cost—$170,000.

Building will be Class "A", of steel, brick and terra cotta, with marble vestibule. There will be a restaurant and roof gardens, elevators, etc.

Temporary Office Building, California street and Van Ness avenue, San Francisco.

Architect—William Curlett, Vallejo street and Pacific avenue, San Francisco.

Owner—Gantner and Mattern.

Cost—$10,000.

This building will be a frame structure, two stories and will be divided into stores and offices

Reinforced Concrete Warehouse, Washington street, San Francisco.

Architect—William Curlett.

Owner—Name withheld for present.

Cost—$15,000.

Plans are being prepared for this building and they will be ready for contractors to take figures on in about two weeks.

Store and Office Building, Drumm and Clay streets, San Francisco.

Owner—Boyd Estate.

Architect—Nathaniel Blaisdell.

Contractor—Frank B. Gilbreth, Atlas Building, Mission street, San Francisco.

Cost—$125,000.

The building will be 60x72 feet and built of reinforced concrete.

Two Story Building, Eighth street, near Folsom, San Francisco.

Architects—Armitage & Rowell.

Owner—Galland Mercantile Laundry.

Cost—$30,000.

A permanent structure is to be put up at once on a lot 105 by 130 feet.

Store and Office Building, Van Ness avenue, near Geary street, San Francisco.

Architect—E. W. Hyde.

Owner—Friedlander & Goldstone.

Cost—$50,000.

Contractor—Daniel Einstein.

Work in this building is well under way. It will be three stories. 275 feet front and 100 feet deep and will contain about ten stores and 50 offices.

Concrete flats, east side of Van Ness avenue, north of Clay street, San Francisco.

Architect, W. C. Mahoney.

Owner. New San Francisco Home Building Company.

Cost, $500,000.

These flats will cover an entire block and will be three stories high. In all there will be 240 flats, all of which will be built of reinforced concrete.

Warehouse, Eighth and Hooper streets, San Francisco.

Owners, Whittier-Coburn Company.

Cost, $25,000.

Architects, Sutton & Weeks, 3966 Washington street, San Francisco.

The building will occupy the lot, 140x213 feet, on the north corner of Eighth and Hooper streets.

At Nineteenth and Minnesota streets, the Geo. D. Tay Company will build a warehouse, also from plans by Sutton & Weeks.

At Eighteenth and Minnesota streets the California Canneries Co. will put up a substantial building.

Three-story and basement brick building, Davis and Jackson streets, San Francisco.

Architects, Sutton & Weeks, 3966 Washington street.

Cost, $20,000.

Owner, David and Angus McKay.

The building will be used for stores and lofts.

Oakland.

Tourist Hotel, Oak street, facing Lake Merritt, Oakland.

Architects—Rand & Skinner, Atlas Bldg., San Francisco.

Cost—$150,000.

Owner—San Francisco & Oakland Building & Real Estate Co., office, Bacon Block, Oakland.

The hotel will be a frame structure, four stories with pitched roof; stucco work outside; 200 rooms; restaurant, banquet hall, etc.

County Jail.

Architect—W. J. Miller, Oakland.

Owner—Alameda County. (Contract to be made by Supervisors.)

Cost—$100,000.

The building will be three stories and will be built on a foundation of concrete. Rock faced granite will be the material used, reinforced with concrete.

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STOP THE SHACK BUILDING

We have read day after day in the San Francisco daily papers of the myriads of steel structures that soon will spring forth from the ashes of the former skyscrapers in the business center. The most vigilant observer may, however, strain his eyes to a condition requiring the services of a competent oculist and yet all he sees in progress is shacks, shacks, shacks,

The toadstool that achieves its full growth in one sultry night is poisonous, and the hastily thrown together shack will surely paralyze the building industry, the beauty and the final resurrection of San Francisco with the ptomaine of cheapness and greed, if its construction is not soon checked.

The Queen City of the Pacific has received a terrible blow, and not one of the after-effects will be as hard of recovery as the injury that will be done by the "temporary" buildings that now dot her surface.

It is true the builders of these "temporary" structures were allowed to proceed upon the assurance that the buildings would be removed after ninety days' notice. But many of them are built on leased land—land that has been leased for terms of from three to fifteen years—so it seems unlikely that our city officials will order the removal of these structures until the owners' ground lease has expired. Instead of a vast array of skyscrapers piercing the sky, are we to see for the next ten years a city of unsightly "groundscrapers"? (This is a new word, but it would seem to fit the occasion.) The merchant or property owner who is proprietor of one of these rough-board creations, patterned after the architecture of Nome City or Dawson—this owner must indeed be a poor politician if he cannot, after receiving a ninety-days notice, work up "pull" sufficient to effect the cancellation of the order to vacate.

The only way to get rid of these homely buildings is to pass and enforce an ordinance requiring the removal within the next six months of *every* shack constructed without a building permit.

The waterfront where the traveler first enters the city, was formerly made picturesque by a fringe of old buildings which tottered toward the bay at almost dangerous angles. It was their very squalor and dilapidation that made them almost romantic. But now we are getting the cheap, rigid, perpendicular and level wooden abomination that flaunts its barren front into our face in a manner that is almost heartrending

The value of real property will not advance by leaps and bounds while these shanties exist. The much-wanted Eastern capital will not be poured in upon us when the advance agent of the Atlantic syndicate reports that the merchants are doing business in one-story buildings that wouldn't make a respectable hay-shed on an Eastern farm.

The San Francisco dailies will do their stricken city more good by making a crusade against these eyesores than they will by blowing out continuously great blasts of hot air about purely imaginative steel castles, the eventual existence of which is dangerously threatened by the persistence of these property-value degradents.

A. W. SMITH.

STATE UNIVERSITY WANTS FILE

Like many other business enterprises in San Francisco the Architect and Engineer lost practically all its office effects, including all back numbers of this magazine. Fortunately, through our Los Angeles office, we have been able to gather together a complete file. A number of subscribers who were burned out shared our fate, and in consequence many requests for books to complete broken files have been made to us. Among the applicants is the University of California. We would gladly supply this want if we could spare our single file, but we cannot. Perhaps there is some philanthrophically inclined subscriber who will donate to the University the missing books. If so we would be grateful and we are sure the librarian of that institution would be equally thankful.

GIVE US CLASS "A" BUILDINGS

It makes us smile when we read in some of the Eastern architectural journals that "After all, perhaps the two and three story frame building is the most desirable class of construction for San Francisco.".

The author of this remarkable statement apparently reaches this conclusion after satisfying himself that California has been, and always will be, subject more or less to seismic disturbances. Now wouldn't San Francisco look fine robed, as it were, in nothing but two and three story wooden buildings?

As a matter of fact, wooden structures met exactly the same fate as stone and brick buildings. Wherever there was inferior underpinning the frame building toppled over or sank into the basement. Where the foundations were substantial no serious harm was done.

The big class "A" buildings were not hurt any to speak of by the quake, while the class "B" buildings, which were damaged, were invariably poorly constructed. In nine-tenths of the cases where stone and brick failed to withstand the shock the fault has been directly traced to either poor construction or bad cement.

San Francisco has been, and always will be, a great commercial center. It can help being a big city no more than can New York or Chicago. It must, therefore, have large buildings for the housing of its army of business and professional men, and its numerous industries and commercial interests. Wouldn't New York City's Broadway look ludicrously funny with both sides of the great thoroughfare dotted with two story shanties? The tall building in San Francisco is indispensable, and as for an earthquake knocking it down, when substantially built, there is no more likelihood of such a calamity than there is of a gust of wind blowing over the big skyscrapers in the Eastern metropolis.

MORE ANENT MAYOR SCHMITZ'S APPEAL FOR DRAUGHTSMEN.

The Secretary of the San Francisco Architectural Club has written to the Secretary of the Toronto Architectural Eighteen Club saying that a rumor has gone abroad about the urgent need of architects and draufghtsmen in San Francisco is without cause. The letter says that there are at present over 350 certified architects in and about the vicinity of San Francisco and over 1000 draughtsmen. Mayor Schmitz's proclamation sent to the mayors of other cities, asking for mechanics, architects and architectural draughtsmen before food or money, is perhaps the source of the rumor alluded to in this letter. There seems to have been a tendency to a rush of draughtsmen in response. Seventy were willing to go from Boston, but by the action of the Boston Society of Architects this number was reduced to eighteen, selected for general usefulness. If other towns responded proportionately in numbers and without the same judicious influence for selection there is good reason for the San Francisco Architectural Club to issue a warning.

One does not quite see of what avail, for rebuilding San Francisco, as it ought to be rebuilt and as it is likely to be rebuilt, an army of draughtsmen will be. unless accompanied by architects. It is a splendid chance, of course, for the draughtsmen to enter the train at Chicago as draughtsmen and come out architects at San Francisco. But it is only in competitions that we expect better work to come from unknown young men than from recognized leaders of the profession. Ordinarily in art, which is longer than life, age has an advantage; and in the architectural army at San Francisco there will have to be a fair proportion of colonels.

Architects do not float about so easily as draughtsmen, but, on the other hand, it is not necessary for them to do so. The work seeks the architect nowadays and a New York architect does not need to leave New York in order to carry on building in San Francisco. No doubt, when definite aim has taken the place of general intention at San Francisco, the architects of the East will be applied to for plans of the more important buildings and they will open branch offices in San Francisco in charge of representatives who will participate in and help to officer the general work of rebuilding.—From the Canadian Architect and Builder.

New Sand Lime Brick Plant.

The Schwartz System Brick Company "Scientific System" for the manufacture of sand-lime brick, W. F. Barnes, President, whose office is temporarily located at 2301 Scott street, San Francisco, is negotiating with a number of parties for the establishment of a sand-lime brick plant at San Francisco or vicinity. It is expected that this plant will be in operation as soon as brick will be needed for the construction of large buildings in San Francisco. It is understood that several well known contractors and builders will be interested in this new company. It is proposed to establish a plant with a capacity of 100,000 to 200,000 per day. It is well known that the sand-lime brick manufactured by the Schwartz "Scientific System" is of the very best, and they are recommended by some of the prominent architects and builders not only of California but throughout the East and foreign countries.

The sand-lime brick industry has advanced more in the last year than any other similar industry, from the fact that this product can be made cheaply, and the brick are absolutely uniform in size and are very durable. Another excellent feature of the sand-lime brick is that they can be laid up with mortar or cement with no greater thickness between the bricks than one-eighth to one-quarter of an inch, as their great adhesive qualities makes it possible for this to be done, and it would be almost impossible to break them apart from the cement or mortar after it once sets. In fact they make a building of the character of a solid stone.

This company owns all the Schwarz "Scientific System" patents for the production of sand-lime brick west of the Mississippi River, and it is contemplated before a very great length of time that several other plants of this system will be installed throughout the State. It is understood that the contract for a plant is already practically closed for Los Angeles, and for a plant near Pittsburg, Contra Costa County. This Company also will handle the output of the factory recently established at Monterey for the supplying of sand-lime brick, and are ready now to make deliveries for face brick purposes. Any communications may be addressed to 2301 Scott street, both with reference to putting in of plants, and to procuring brick at very moderate prices.

The Publisher's Corner

Van Emon Elevator Company.

The Van Emon Elevator Company, which until very recently was the only California manufacturer of elevators not controlled by the "Elevator Trust," did not perish in the fire that occurred in San Francisco, April 18. The company has already roofed over the old brick walls of its machine shop, and in a few days the adjoining brick building will be ready to shelter its office force at the old number, [illegible]2-54 Natoma street. As early as Thursday, April 26, the Van Emon Elevator Company had its men at work in the cellar of the Natoma street premises jacking over the heavy machinery so that the carpenters could set in place the stout posts to support the floor girders. Meanwhile other men pitched a tent across Natoma street for an office, and in this tent a rush order was given to a large local machinery house for nearly $10,000 worth of machinery for immediate delivery. Other machinery and two gas engines for power had been ordered from San Jose and Los Angeles, and by May 18 (one month after its destruction by fire), the machine shop was started up. The buildings on Natoma street will be used for offices and a repair and erecting shop. In West Berkeley the company is building a factory containing 10,000 square feet of floor space on a piece of land with a frontage of 300 feet on the Southern Pacific Railroad close to the bay.

In New Quarters.

Gladding, McBean & Company, the well known brick and terra cotta firm, has erected a substantial building at the corner of Eddy and Hyde streets. Since the fire the company has had its headquarters at the Gladding residence on Franklin street. The new building, while a temporary structure, is roomy and quite desirable for present needs. Later on the company will erect a handsome brick and terra cotta building. The company has taken a number of good sized orders for pressed brick and terra cotta since the fire, which shows that the industry has suffered no more than any other by the catastrophe.

The Pacific Window Glass Company is in fine shape to fill any and all orders for window glass, plate glass, chipped and ground glass, etc. The company's big factory at Stockton was uninjured by the earthquake and since April 18, the shops have been running full blast. A temporary office has been established at 1818½ Post street, San Francisco. The quality, weight, temper and brilliancy of finish of the Pacific Company's glass is unequalled on the Coast. The company has on hand ready for immediate delivery 1800 windows, thoroughly seasoned, just the thing for temporary buildings. Orders should be sent to the main office, 1818½ Post street, where they will receive prompt attention.

The Western Iron Works has bought a lot, 20x60 feet, on the west side of Main street, south from Mission, for $500 per front foot. The company owns the adjoining property and with the additional lot will have sufficient room to erect one of the largest plants in that section of the city. The company is doing a fine business.

The John Finn Metal Works are now permanently located and doing business in considerably enlarged quorters at Second and Harrison streets, San Francisco. The company's specialty is Babbitt metals, solder and galvanizing.

Of all the various brands that are now placed on the market none gives greater satisfaction than the celebrated "Lion" artificial Portland Cement, manufactured by Dufossez & Henry of Cronfisher, Belgium, and sold by A. Breslauer, Builders' Exchange, Oakland, Cal., who informs us that he has 3000 barrels on board the steamship Setos due to arrive in San Francisco early in July.

Harry A. Thomas, a Fresno architect, has opened an office in the Forsyth building, Fresno. Mr. Thomas was formerly with McDougall Bros.

The Hercules Manufacturing Company, formerly of Ninth and Harrison streets, whose plant was completely destroyed by the fire, will have their new building on San Bruno avenue between Fifteenth and Sixteenth streets. It will be completed by June 15th. Already the company is rushed with orders, as the plaster containing their fibre was not damaged by the quake and the builders want no better evidence to convince them of the merits of the goods.

The Keystone Boiler Works are rebuilding on the site of their burned factory. The company has strong faith in the future of San Francisco.

The Globe Electrical Company of Monterey has opened a branch store at Salinas. The company's business has nearly doubled in the last few months. The concern is prepared to undertake any electrical job in any city on the coast, San Francisco in particular, and will guarantee satisfactory work.

That the lesson learned through the late conflagration has been thoroughly taught is made plain by the avidity with which fireproof material is seized upon by our local builders. There have been many new devices offered them, and any number of new agencies are competing for the trade which comes with the rebuilding of a great city. One of the best things which has come to our notice is the Voightmann fireproof, all-metal and automatic-closing window. Nor does it come without credentials. It has stood the test of the Rochester, Toronto and Baltimore fires, and, had our local skyscrapers been provided with it, millions of records would have been saved and hundreds of thousands of dollars now being expended for the rehabilitation of gutted buildings would still be found in the pockets of our property owners. So thorough has been the recognition of the merits of the Voightmann window that, in Eastern cities, its use is compelled by municipal ordinance and the reduced premium rate its use permits pays within a short time its entire cost. Healy-Gale Co., St. Mungo building, Golden Gate avenue, Fillmore street, are the Pacific Coast agents.

The firm of F. A. Gilley & Co., formerly of 521 Howard street, has been incorporated as the Gilley-Schmid Co., and announces that it is now ready for business at the northwest corner of 13th and Mission streets. Plumbing and heating systems tested, overhauled and repaired.

The Joshua Hendy Machine Company will build new shops at Sunnyvale, between Mountain View and San Jose on the Coast line of the Southern Pacific Company.

A couple of weeks before the fire the San Francisco Cornice Company deserted its old office at Fourteenth and Florida streets for more pretentious quarters on Sansome street. The company's office force were glad to get away from the dirty factory. Since the fire the office has been transferred back to the factory, and never was the old building more appreciated. The company is rushed with orders.

The Western Builders' Supply, formerly on New Montgomery street had temporary offices at 121 Falcon avenue. Since June the company has been at Fourth and Natoma streets. "San Francisco is good enough for us," is their motto.

The Hercules Gas Engine Company, burned out in San Francisco before the big fire, now has a fine plant in Alameda, and is running full blast day and night.

The Standard Brass Works is to erect a permanent two-story foundry building on Folsom street, near Fourth.

S. C. Abbott, of 957 Harrison street, Oakland, is the Pacific Coast representative of the Richter Manufacturing Company of Tenafly, N. J., dealers in burlaps, canvases and other decorative textiles.

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All up-to-date builders realize the worth of a labor-saving tool, especially when that tool is a practical device that has passed the experimental stage. The Miller hand mortiser is a labor-saving tool that has been tested by builders with success in all parts of the United States and in all kinds of wood. The machine is the invention of Albert W. Miller, of Riverside, Cal., and is the fruit of twenty-five years of practical mechanical experience in the building line. The Miller hand mortiser is a machine made especially to cut openings in doors for mortise locks. It can be operated easily in all kinds of lumber from three-quarters of an inch to three inches in thickness. Holes can be mortised from a half-inch to one and one-eighth inches in width and from four to five inches in depth, depending upon the length of the mortise. The machine is most successful in mortising doors for locks. It does the work in one-fifth the time of the old method with a chisel and hammer. It will cut an opening for a mortise lock in three minutes.

The California Art Glass Bending and Cutting Works, William Shroeder, president, is now located in its new building at 938 Howard street, between Fifth and Sixth streets, San Francisco. The company announces that it is now in a position to execute any orders for art glass, ground and cut glass, plain leaded glass, beveled, chipped and prism glass. A large stock of opalescent glass has been received and all orders will be promptly filled.

Brittain & Company, successors to the C. H. Philpott Company, have found it necessary to enlarge their spacious temporary quarters at the corner of Van Ness and Turk streets, so great has been the volume of business carried on since the fire. The company was the first big house to occupy temporary quarters on Van Ness avenue. It also claims the distinction of being the first hardware concern to get back to business after the disaster. Probably no company in San Francisco is carrying a more complete line of hardware, both builder's and general, sporting goods, etc., than the Brittain Company, which speaks much for the new corporation's enterprise. Mr. Brittain, the president, is certainly a hustler.

The firm of Knickmann & Nocenti, manufacturers of scagliola and artificial stone in New York City, and who are doing the scagliola work at the Fairmount Hotel, have sent O. S. Sarsi to the Pacific Coast to take charge of the company's business in San Francisco. Mr. Sarci is temporarily located at 1112 Eddy street, opposite Jefferson Square. Mr. Gori is no longer connected with the company.

WITH THE FRESNO BUILDING TRADES.

The burning of practically all the steel plants in San Francisco leaves the J. H. Burnett Iron Works of Fresno, one of the largest now doing business in California. Mr. Burnett has supplied with steel or iron nearly all of the big buildings in the San Joaquin Valley during the last few years. The list includes the Sequoia, the Hughes Hotel, Chamber of Commerce, Patterson Block, High School at Porterville, Bank of Visalia, the R. E. Hyde Building at Visalia, residence of C. J. Lindgren, Fresno Grammar School, Theater at Bakersfield and new Fresno City Hall.

Charles E. Brodeur is a new comer in Fresno. He is a painter, paper hanger and decorator. Mr. Brodeur comes from South Acton, Mass. He resides at the corner of East and Florence avenue, Fresno. Mr. Brodeur papered and painted the Congregational Church at Fresno and a church of the same denomination at Olander. He also did all the painting and sand papering on the outside of the new Y. M. C. A. Building. He painted the

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residence of Robert Kennedy. His latest work and which has received high praise is the painting and decorating of the Sequoia Hotel. There are fifty-eight rooms besides a store which have been delicately and artistically tinted by Mr. Brodeur.

To use an apt slogan of a well-known dry goods establishment: "Watch us grow."

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During July and August the Santa Fe will sell special round trip tickets to Kansas City, Chicago and many other Eastern points on the following dates. July 2 and 3; August 7, 8, 9. These tickets will be honored on the California Limited The rate will be just one half the regular fare. Ask the Santa Fe agent.

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The Barrett-Hicks Company is just of age to use a figurative speech. Twenty-one years ago this firm came into existence. For a few months it was known as the Fresno Hardware Company but since the name Barrett-Hicks Company has been retained. The firm is today one of the most successful hardware houses in the State. Its establishment in Fresno is one of the largest in the San Joaquin Valley. Mr. Barrett was formerly with G. & E. Snook of San Francisco, while Mr. Hicks came from Los Angeles. The firm supplied the plumbing and gas fixtures in the Fresno County Hospital, Sequoia Hotel and Chamber of Commerce building, also the cornices for the Wallace building, Bowman block, County Court House, Fresno and the Olsese block in Merced.

For fifteen years H. A. Hansen has been building residences in Fresno and today many of the finest homes in the Raisin City are monuments to Mr. Hansen's craftsmanship. Among the houses which he has built are those of Dr. Maupin, H. Graff, T. K. Prescott, Mrs. Barry and others. He is now erecting a $5,000

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San Francisco

home for Mr. Fred Fisher, in North Park. Mr. Hansen has also built a number of fine school houses and country residences.

Frank Childs, the well known Visalia painter and decorator, has been painting houses and buildings for a quarter century. He is a thoroughly experienced man in his line of trade and his reputation as a polisher of hardwood and painter and decorator extends all over the valley. Among the best pieces of work done by Mr. Childs is the decorating of the interior of the First National Bank in Visalia. Experts say that this piece of work is superior to anything of its kind ever before seen in Visalia or vicinity. The color scheme is brown with cream colored ceiling while the wood work is of beautiful polished oak. Among the other buildings painted or decorated by Mr. Childs are the Bank of Visalia, Grammar School, Harvey House and a number of residences.

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The Steger Electrical Works report that they have just closed the contracts for the wiring on the Fulton Hotel and City Hall buildings in Fresno. This firm has been identified with the building industry on the San Joaquin Valley for the past six years and during that time they have done the greater part of the large construction work in their line. Their work has proven entirely satisfactory in every case and their business is conconstantly spreading into new territory.

Among the large buildings may be mentioned the Washington Grammar School, Radin & Kamp, McClurg, Carnegie Library, Y. M. C. A., and Sequoia Hotel Buildings in Fresno, the Fresno and Merced County Hospitals, the Hyde, Vucovich and First National Bank Buildings in Visalia besides many others in the various other towns of the valley.

C. J. Craycroft & Son is the name of the oldest brick company in Fresno County. The company has two up-to-date brick plants equipped with one of the best sandmould brick machines on the market. The plant on the Santa Fe Railroad has a capacity of 25,000 to 30,000 brick per day. The company use the rack and pallet system and burns the brick with oil. On the Southern Pacific yard the company has a machine of the same make and capacity, which gives a combined capacity of 50,000 to 60,000 per day, which will be increased as business warrants. On this yard they have a continuous rotary kiln and burn with coal.

Mr. C. J. Craycroft is the President and Manager. He has been in the brick business almost continuously since the close of the civil war.

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Contents for July

PAGE
Frontispiece—The Luning Building 18
What the Earthquake Actually Did to California Federal Buildings . . . . *W. A. Newman, Architect* 19
Illustrated by Photographs Taken Immediately After the Disaster
May Have Experiment Station 26
Insurance Investments . . . . *J. T. Walsh, C. E., M. E.* 27
Rebuilding a Great City and the Part Taken by a Big Construction Company 29
Architect A. F. Rosenheim's Impressions of San Francisco 31
Rural School Buildings in California . . . . *W. H. Weeks, Architect* 33
With Illustrations by the Author

HEATING, LIGHTING AND ELECTRICAL WORK—

The Lighting of Temporary Buildings . . . . *Carl E. Roesch* 41
Discussion of Some Details of Design and Construction of Sanitary Sewers . . . . *W. T. Knowlton* 43
The Uniform Design of Reinforced Concrete . . *Louis F. Brayton, C. E.* 48

CEMENT AND CONCRETE—

Hollow Blocks—Good and Bad . . . . *William B. Gester, C. E.* 49
With Illustrations
Government Ideas on Cement and Concrete 52

TERRA COTTA AND BRICK—

Brick in San Francisco 60
Mr. Blinx's Bricks 61
More First Class Designs and Good Construction . *W. W. Breite, C. E.* 63
With Photographs by Walters

INTERIOR DECORATION—

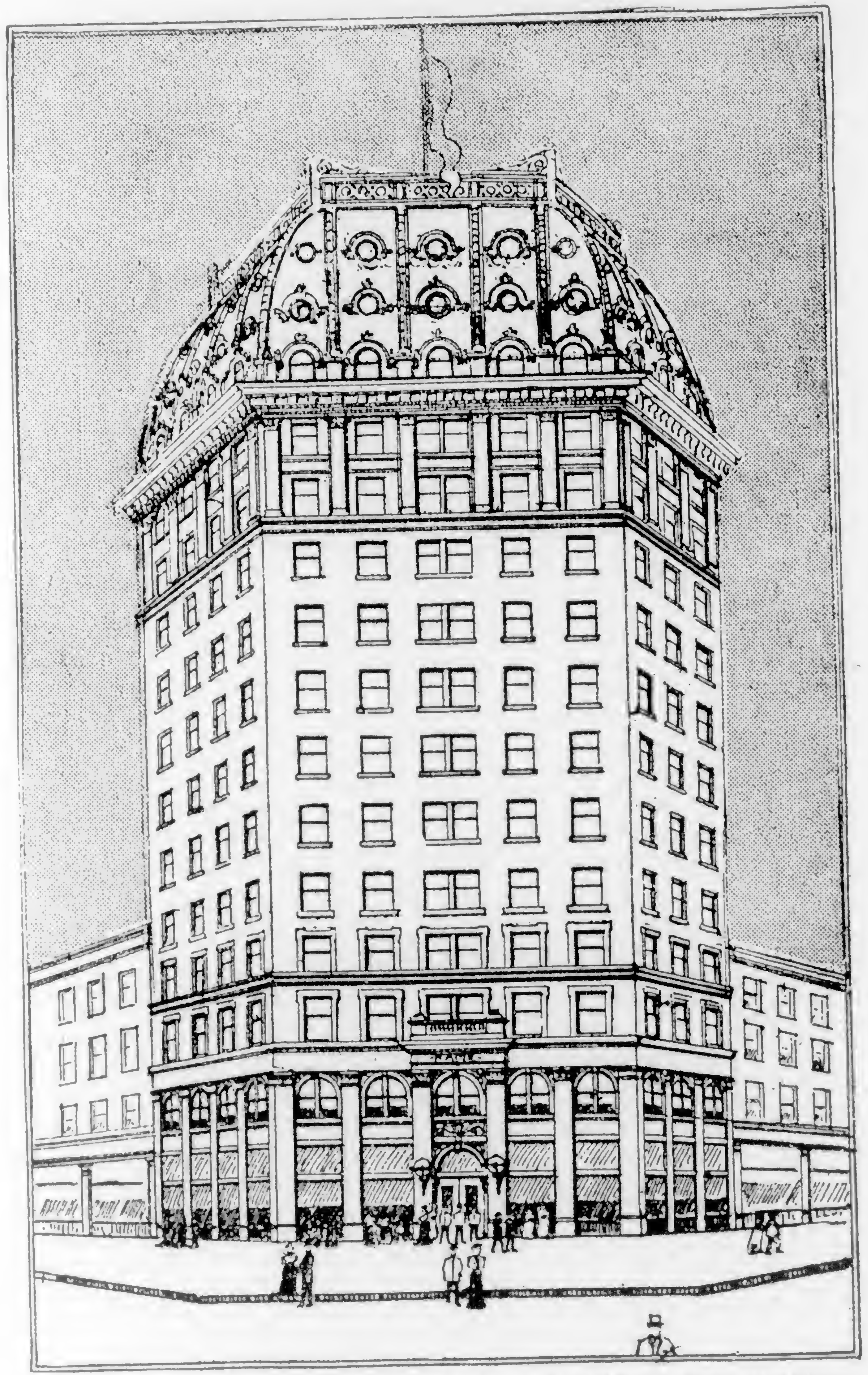
Wall Papers of Olden Times . . . . *C. Walter Tozer* 66
Fashions in Wall Coverings 69
Where Advertising is Valuable 69

AMONG THE ARCHITECTS—71

EDITORIAL—

Leave Us Something . . . . *F. W. J.* 74
Concrete to be a Factor in Rebuilding . . . . *W. P. Day, C. E.* 75
Stanford White, Architect and Artist 75
The Cement Situation 76

PUBLISHER'S CORNER—



The Luning Building to be Erected at Market and Drumm Streets, San Francisco E. J. Vogel, Architect

1-19 Adamley

THE
Architect and Engineer
Of California

Vol. V. JULY, 1906. No. 3.

What the Earthquake Actually Did to California Federal Buildings

By W. A. NEWMAN, Architect*

CONSIDERABLE interest has been manifested since the earthquake on April 18th last over the peculiar condition presented by the exterior of the San Francisco Post Office and Court House building at Seventh and Mission Streets. In the newspapers and magazines which have come to hand various writers give explanations amusing to those acquainted with the actual facts.

For years it has been averred that the Post Office was situated on a bog, that an underground stream was undermining the foundations and settlements would take place which would necesitate its being abandoned as unsafe. Such sensational statements, however, have not been borne out by recent events, for the beautiful structure still stands on practically the same lines as contemplated originally, an enduring monument and a credit to the skill and efficiency of the Supervising Architect, James Knox Taylor, and Superintendent of Construction J. W. Roberts.

Sand covers the entire site of the building, which continues to a depth of 107 feet at Seventh and Stevenson Streets.

The steel grillage and concrete footings at Seventh and Mission Streets were placed upon sand at a depth of 33 feet below the first floor line; no piles having been used in the foundations.

The water table seat and seat supports, together with tile platforms, rest upon an eight-inch thick concrete base, directly on the sand, and are separate from the main foundations of the building.

The shock displaced the soft upper strata in Mission Street, raising and lowering the grade as much as three feet six inches in some places, allowing the sand to slide away from the concrete base, and permitting the sidewalk, platforms and granite seat supports to settle as shown by the photographs. The external appearance of walls at lower portions of pavilions caused much anxiety as to the safety of the building among many visitors and employees, which was hardly allayed, even after an examination of the curtain walls and upper stories which presented no damage.

---

*Mr. Newman was assistant to Mr. J. W. Roberts, Superintendent of Construction, during the erection of the new Postoffice Building, and his work was highly commended. Mr. Newman was recently admitted to practice architecture in California. His offices are in the Postoffice Building.

The mailing platform wall in the rear, one story in height, containing no steel frame, was separated from the main walls by the shock, breaking and tearing apart heavy wrought-iron anchors and cramps, etc.

The first story received the full force of the shock, the second story to a less extent, and scarcely in any places in the third and fourth stories is there any damage, the heavy granite cornice being absolutely intact and free from cracks.

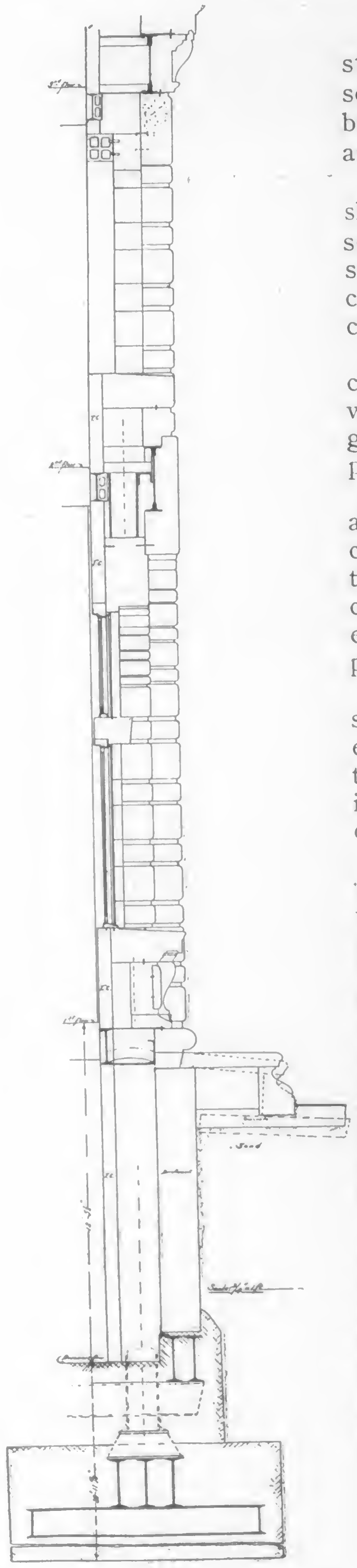
A large portion of the six-inch porous terra cotta blocks in partition walls in lower stories was rent and shattered; however, owing to the good quality of cement mortar used, many of the partitions will be saved.

Fire gained access to the third story, and after the heroic efforts of a few brave men, was confined to the suite of four rooms occupied by the United States District Judge, including the costly redwood library filled with books and other inflammable material which tested the fireproof construction used in the building.

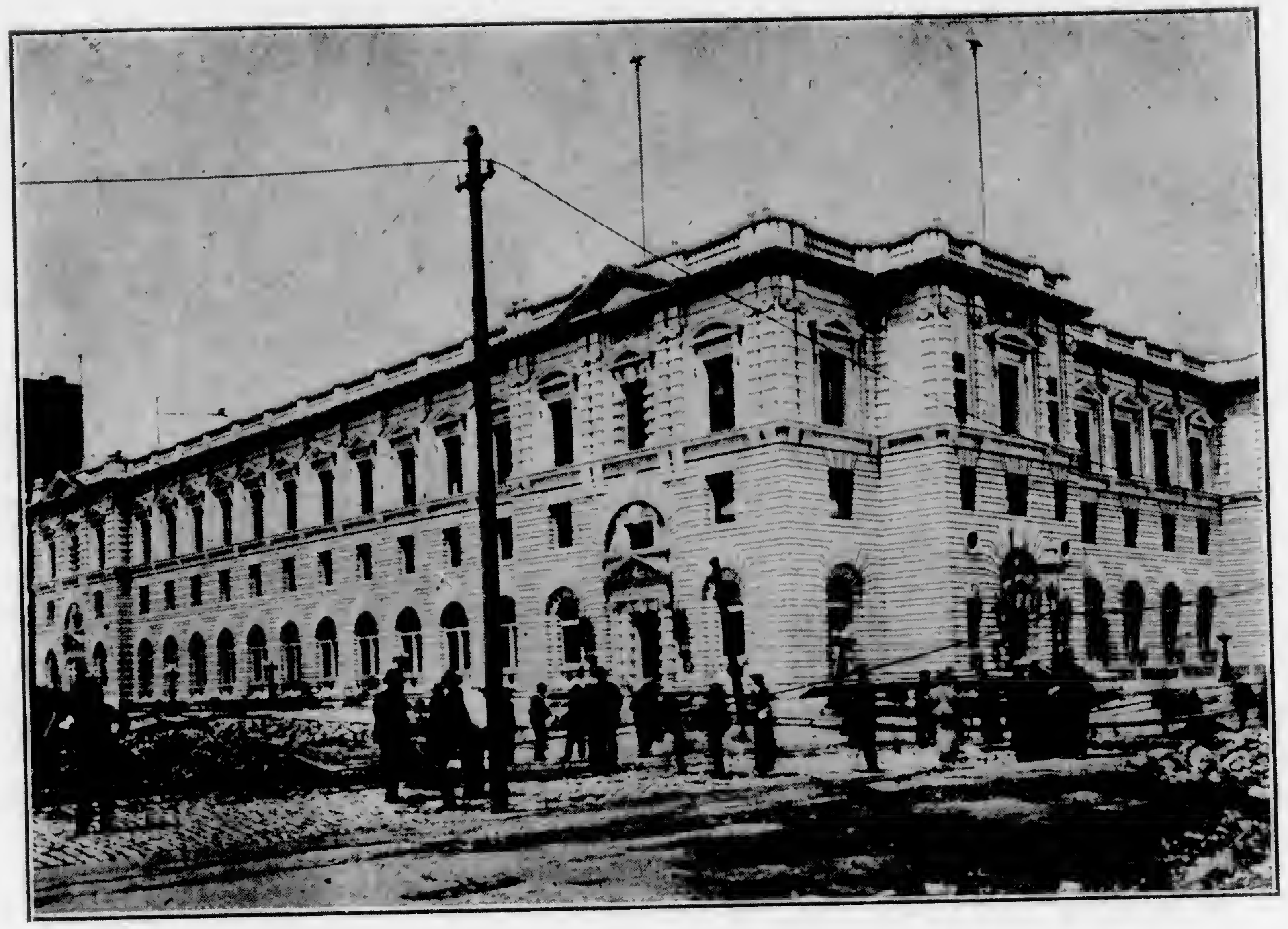
Two steel-lined vaults are contained in this suite. The outer doors were damaged considerably, but the inner vestibule doors and the contents were found practically uninjured, thus proving the value of this type of vault. The entire contents of the four rooms was totally destroyed.

The library, 27'0"x31'0" and 19'0" in height, with oak parquetry floor, contained curly redwood bookcases, furred out with wood studs, and paneling covering the four walls to a height of 13'6", above which were carved wooden consoles and a heavy beam ceiling. Over 30,000 volumes were burned in this room; the heavy marble consoles at window seats, together with the three-inch Gaen stone facing of mantel, were reduced to powder, but the reinforced clinker concrete floors, when cleaned of ashes, were found to be in absolutely perfect condition, as may be seen by any one who visits the building.

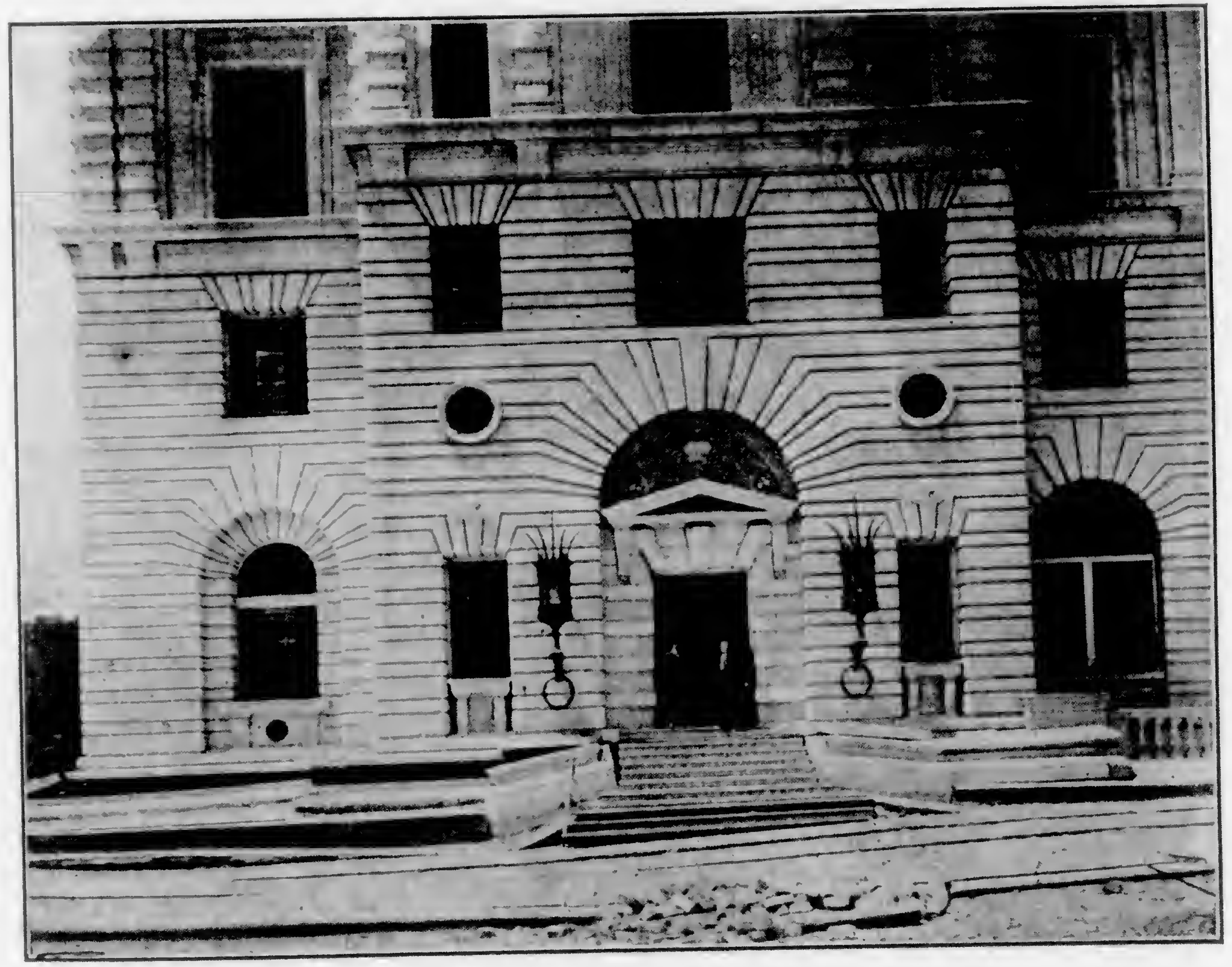
The clinker concrete floors throughout the building received no damage. The first-story corridor vaulted mosaic ceilings, placed upon reinforced clinker concrete backing, escaped unharmed, but ceilings at the entrance vestibules, where terra cotta was used, were damaged so as to necessitate expensive repairs. It is contemplated to use reinforced concrete to replace the damaged terra cotta work. Much of the defective clinker concrete work found in other buildings in this city may be attributed to the poor quality of the aggregate used.



United States Postoffice and Court House, San Francisco. Section through exterior wall showing settlement of Platforms and Water Table Seat and Supports in Dotted Lines.



Postoffice Building, San Francisco, Showing Entire Seventh Street Front



Seventh and Mission Streets Corner of Postoffice Building, San Francisco, Showing Settlement of Platforms, Sidewalk, Etc., with the Lines of the Building.

The excellent condition of the entire Mission, Stevenson and Seventh Street curtain walls shows the efficiency of the diagonal channel bracing used from columns to girders above at the various floors.

Under the influence of the quake the first-story stonework, which starts just below the grade line on top of the brick foundation wall (the later resting on the double exterior girders below basement floor) and is carried up to the under side of the exterior girder at second floor line was wrenched and broken, bulging outward at several small returns of pavilions where no diagonal bracing occurred.

The exterior walls reveal no cracks or bulging above the second-story sill course. Girders at this line carry the stonework to the third story, where others support the masonry above.

A terra-cotta cornice crowns the enameled brick court wall having 444 lineal feet, with a projection of two feet two inches. This wall and cornice is also in perfect condition, not a crack showing.

It is the intention of the Government to restore the Post Office building to its original condition. This will make a total cost for site, building and furnishings of over $4,000,000.00.

It has been customary in many of our progressive cities for one or a group of public-spirited citizens to donate a site for the Government buildings, as has been done at Fresno, Salt Lake City and Los Angeles.

It may be suggested at this time that such an opportunity is now afforded for a park from the Post Office through to Market Street, forming a fit setting for such a magnificent structure and a fire protection for the future. This should by all means be provided, as interference with or the destruction of the mails, the business of the United States Courts, etc., is a matter of general concern.

United States Mint.

At one time during the conflagration the United States Mint was surrounded on three sides by fire, and but for the courageous work of its defenders would have suffered much loss.

The roof covering (originally of sheet copper) was perforated with pinholes, caused by the action of sulphuric-acid fumes, in many places. The torrent of cinders started to burn where temporary asphaltum roofing had been placed upon the copper, and rafters underneath took fire, but were extinguished with little damage.

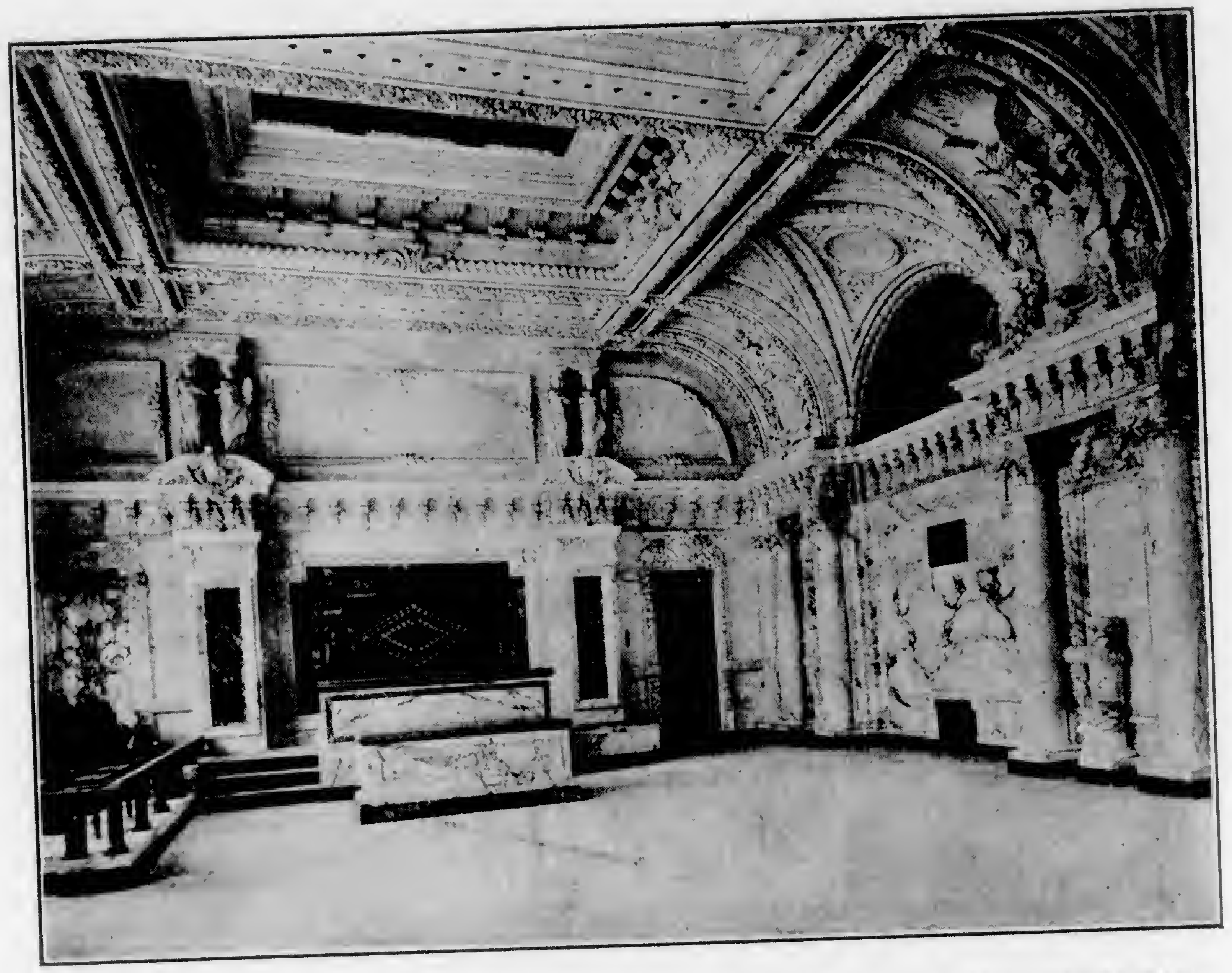
The amount of heat from adjacent buildings may be judged by the photograph, which shows the northeast wall badly scaled. This wall will be rebuilt.

The cast-iron shutters on the two lower stories, finished on the outside with a nonconducting covering, prevented the fire gaining access at these points.

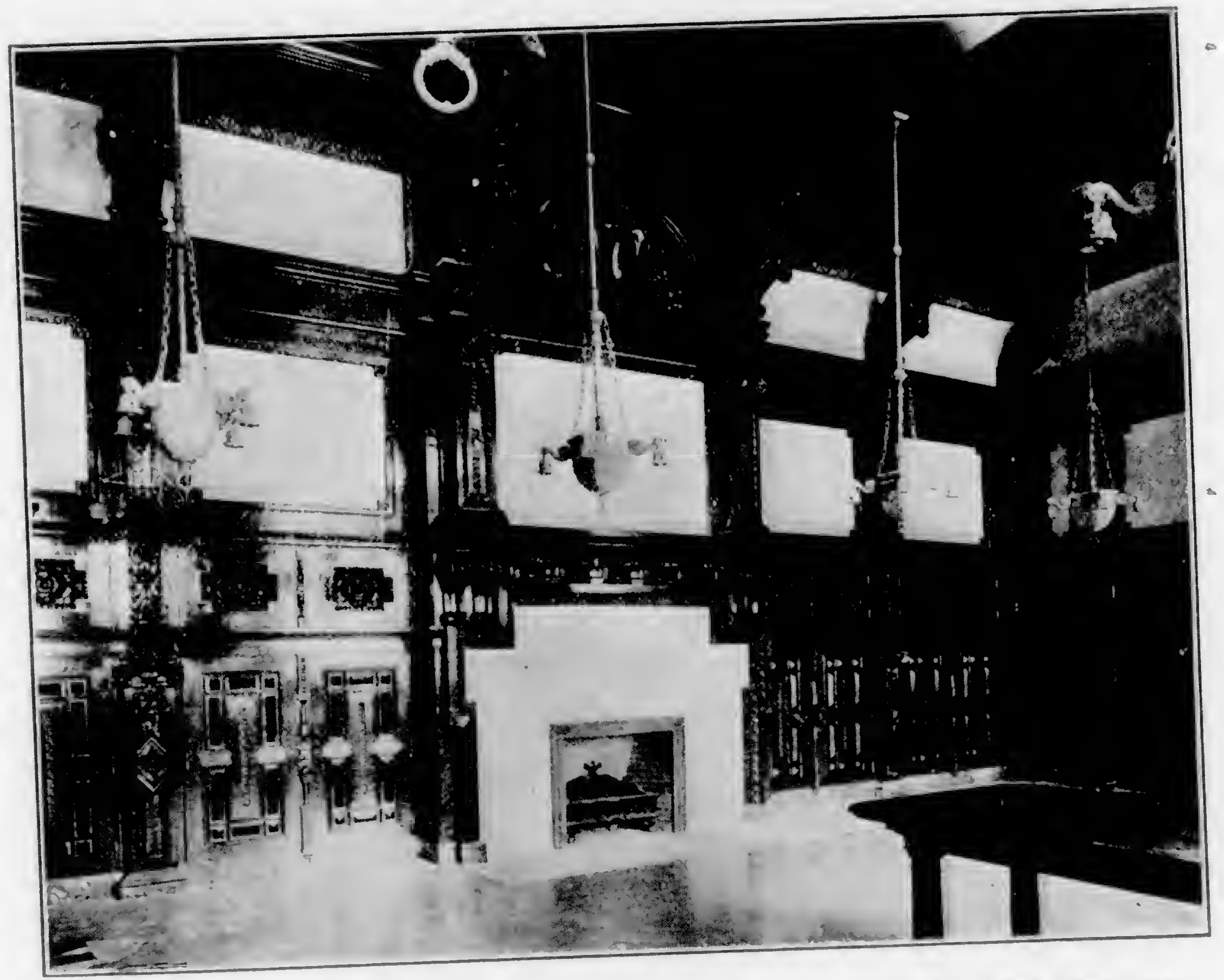
The two main chimney-stacks, 12'0"x12'0", towering 68 feet above the roof, were considerably injured. Four cast-iron columns, 21" in diameter, with horizontal and diagonal bracing reinforced the brickwork.

The cast-iron flanges and lugs at a point 12' above the roof were broken, necessitating the placing of a number of special wrought-iron plates to remedy the defects.

During the past thirty years the sulphuric-acid fumes have eaten away the ornamental cast-iron work at the top of these stacks to such an extent that small fragments fall from time to time upon the roof. It is contemplated to remove this ornamental work and lower the stacks about 24 feet.



Postoffice Building, San Francisco, United States Circuit Court, Third Story. There was no Damage to any Work Shown in This Picture.



Postoffice Building, San Francisco, United States Court Library, Third Story. This Room was Totally Destroyed by Fire Together With 30,000 Volumes.

The excellent condition of the entire Mission, Stevenson and Seventh Street curtain walls shows the efficiency of the diagonal channel bracing used from columns to girders above at the various floors.

Under the influence of the quake the first-story stonework, which starts just below the grade line on top of the brick foundation wall (the later resting on the double exterior girders below basement floor) and is carried up to the under side of the exterior girder at second floor line was wrenched and broken, bulging outward at several small returns of pavilions where no diagonal bracing occurred.

The exterior walls reveal no cracks or bulging above the second-story sill course. Girders at this line carry the stonework to the third story, where others support the masonry above.

A terra-cotta cornice crowns the enameled brick court wall having 444 lineal feet, with a projection of two feet two inches. This wall and cornice is also in perfect condition, not a crack showing.

It is the intention of the Government to restore the Post Office building to its original condition. This will make a total cost for site, building and furnishings of over $4,000,000.00.

It has been customary in many of our progressive cities for one or a group of public-spirited citizens to donate a site for the Government buildings, as has been done at Fresno, Salt Lake City and Los Angeles.

It may be suggested at this time that such an opportunity is now afforded for a park from the Post Office through to Market Street, forming a fit setting for such a magnificent structure and a fire protection for the future. This should by all means be provided, as interference with or the destruction of the mails, the business of the United States Courts, etc., is a matter of general concern.

United States Mint.

At one time during the conflagration the United States Mint was surrounded on three sides by fire, and but for the courageous work of its defenders would have suffered much loss.

The roof covering (originally of sheet copper) was perforated with pinholes, caused by the action of sulphuric-acid fumes, in many places. The torrent of cinders started to burn where temporary asphaltum roofing had been placed upon the copper, and rafters underneath took fire, but were extinguished with little damage.

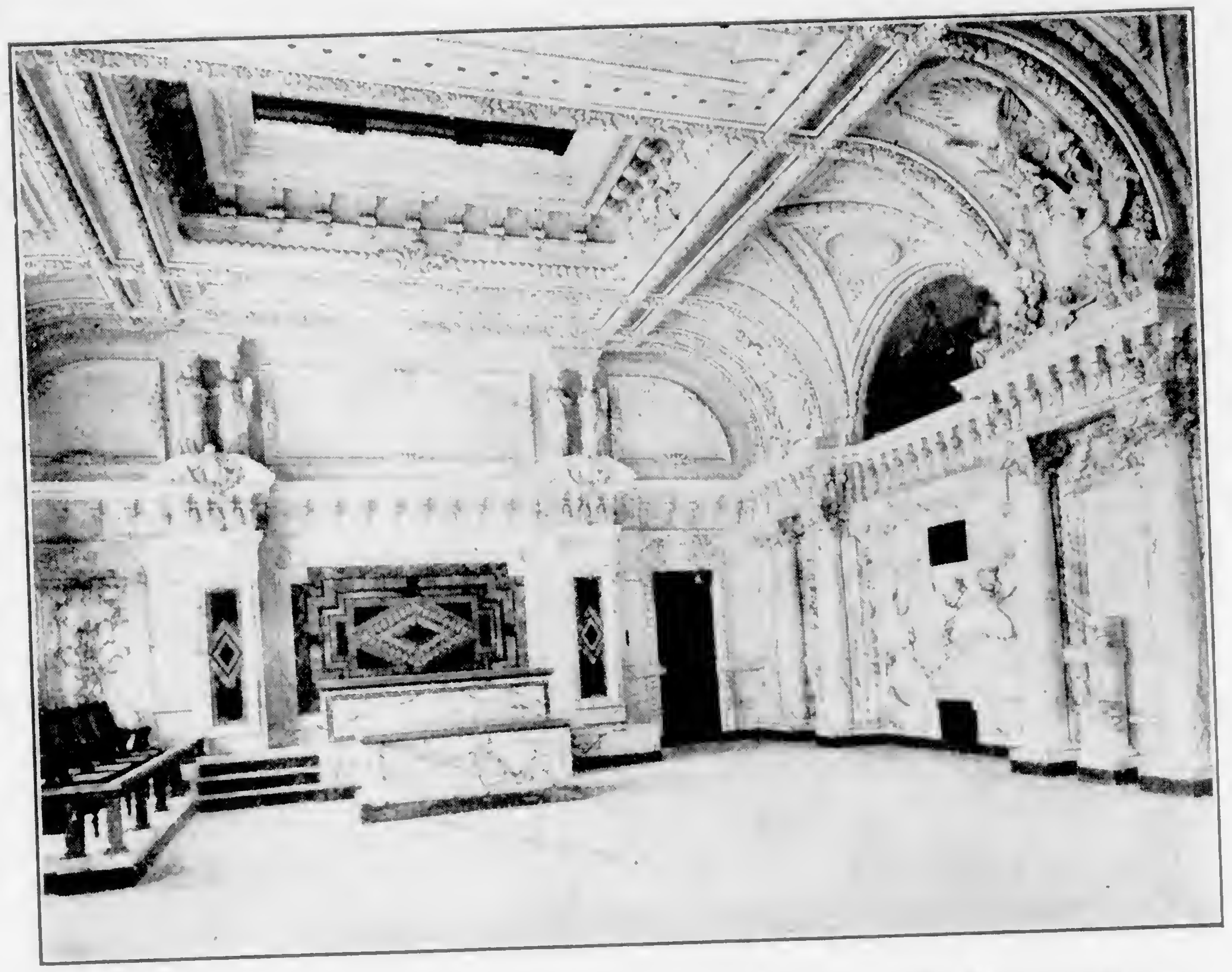
The amount of heat from adjacent buildings may be judged by the photograph, which shows the northeast wall badly scaled. This wall will be rebuilt.

The cast-iron shutters on the two lower stories, finished on the outside with a nonconducting covering, prevented the fire gaining access at these points.

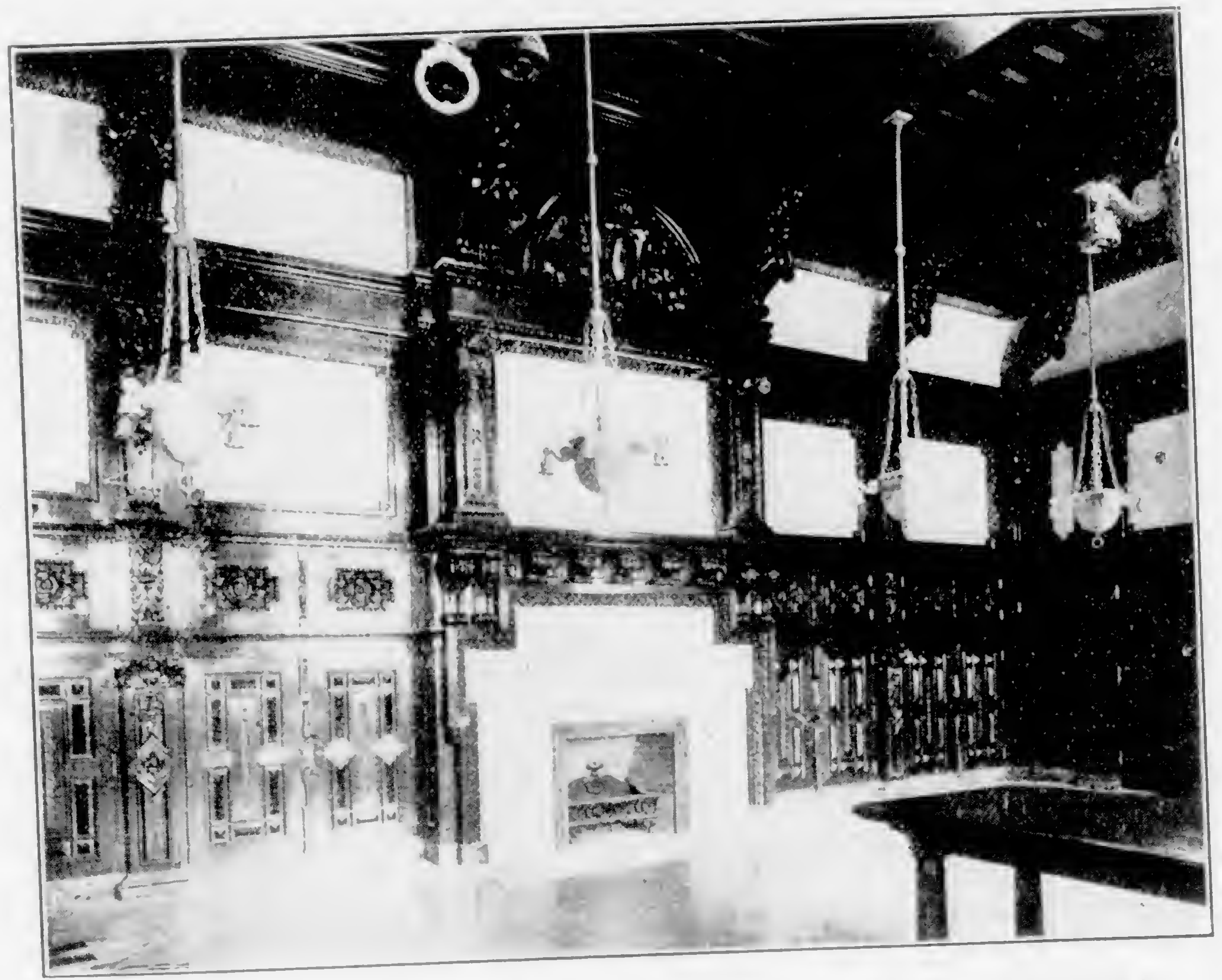
The two main chimney-stacks, 12'0"x12'0", towering 68 feet above the roof, were considerably injured. Four cast-iron columns, 21" in diameter, with horizontal and diagonal bracing reinforced the brickwork.

The cast-iron flanges and lugs at a point 12' above the roof were broken, necessitating the placing of a number of special wrought-iron plates to remedy the defects.

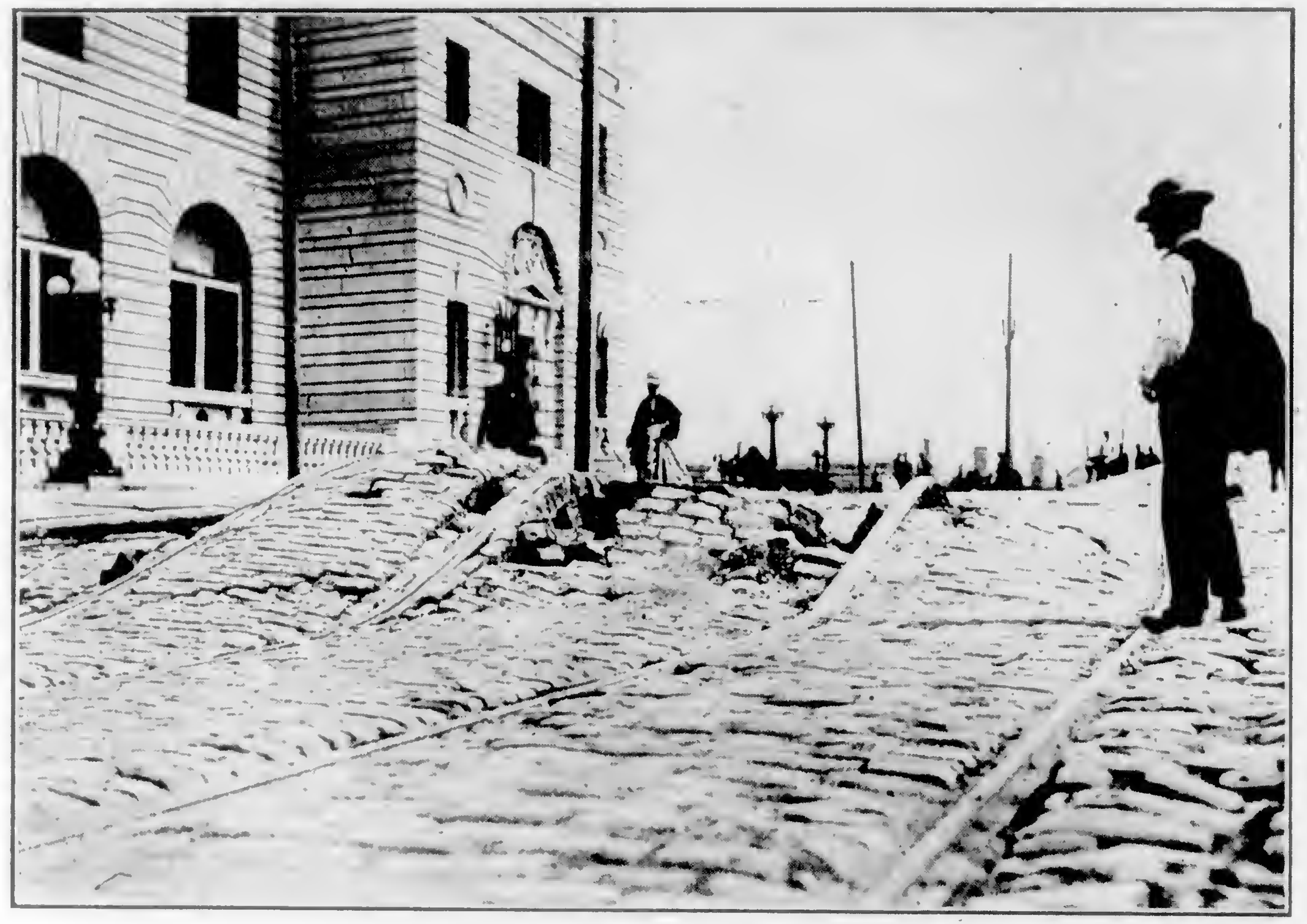
During the past thirty years the sulphuric-acid fumes have eaten away the ornamental cast-iron work at the top of these stacks to such an extent that small fragments fall from time to time upon the roof. It is contemplated to remove this ornamental work and lower the stacks about 24 feet.



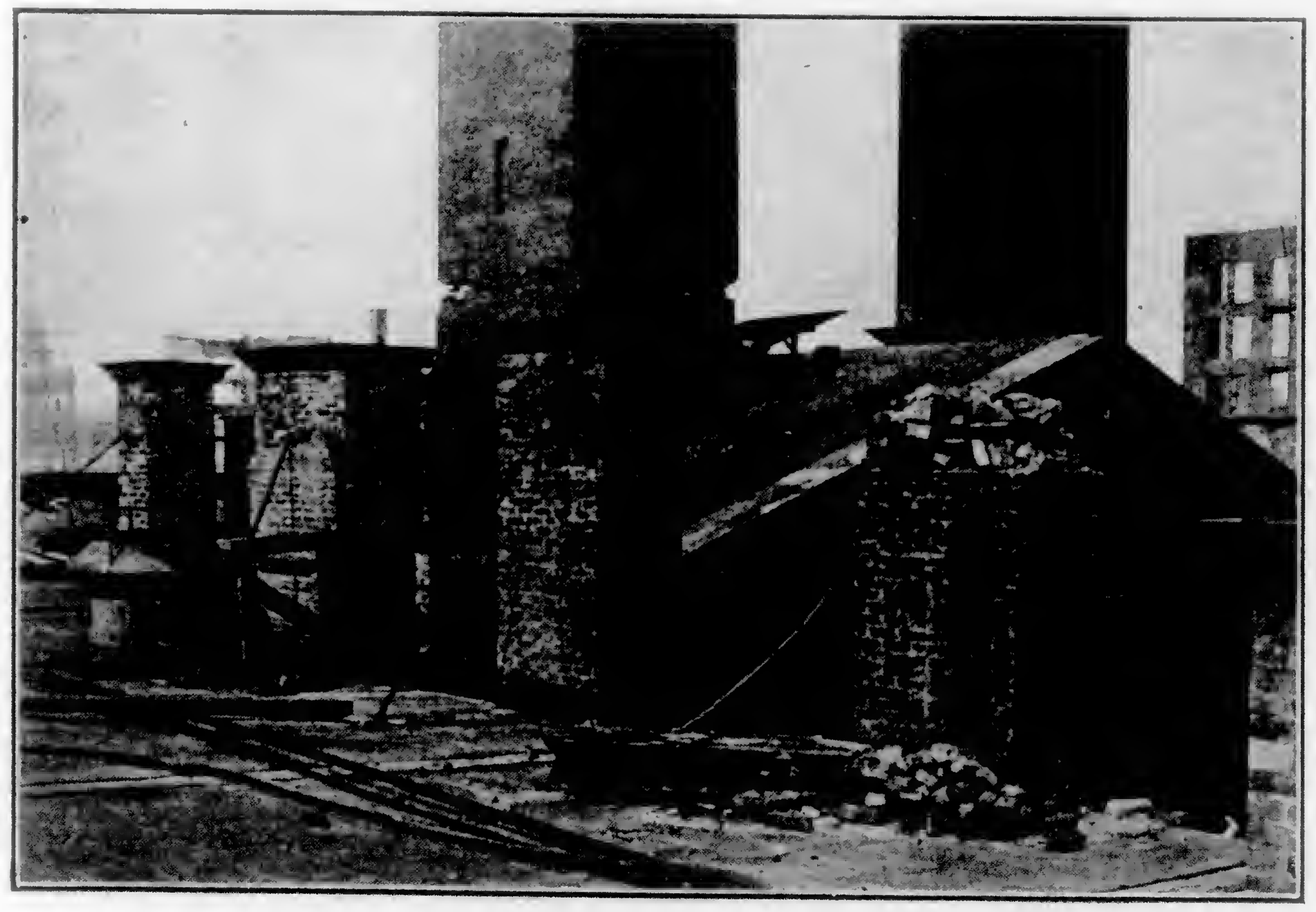
Postoffice Building, San Francisco, United States Circuit Court, Third Story. There was no Damage to any Work Shown in This Picture.



Postoffice Building, San Francisco, United States Court Library, Third Story. This Room was Totally Destroyed by Fire Together With 30,000 Volumes.



Postoffice Building, San Francisco, Showing Effect of the Earthquake on "Made" Ground in Front of the Building.



United States Mint, San Francisco, Showing Damaged Chimney Stacks.

United States Mint, San Francisco, Showing the Northeast Wall Scaled Off by Fire

The heavy stone and brick construction of this building, well braced with large anchors and ties, withstood the severe shaking, and only a few minor cracks may be seen as a result.

U. S. Sub-Treasury and Land Office.

The contents of this building were destroyed by fire, with the exception of the coin vaults, which are intact. It is proposed to remove the walls above the second-story sills and refit the remaining portion for the use of the Sub-Treasury until the completion of the new Custom House, when the Sub-Treasury will be provided with quarters in that building.

This structure was built in 1864 and occupied as a Branch Mint until the completion of the present Mint in 1877, when the building was reconstructed for the Sub-Treasury and other Government offices.

The brick walls and brick and concrete floor arches were not seriously impaired in the lower stories.

U. S. Appraisers' Building.

After very creditable efforts on the part of the officers and employees, this building was saved from fire. It was completed in 1881. The ground in this vicinity is all made land, it having been formerly covered by the waters of the bay; and, with a view to securing suitable foundations, and as a protection from the destructive influences of moisture, this building has been placed on a massive bed of concrete and the basement walls securely anchored thereto; no piles were used in this foundation. This structure remains practically unharmed by the earthquake and fire.

Sub-Treasury Building, San Francisco, Gutted by Fire

May Have Experiment Station

THE Structural Association of Engineers contemplates the establishment of an experiment station for testing the fireproof qualities of various sorts of building material. It is likely that one of the most elaborately equipped stations of this kind in the country will be organized soon.

At a recent meeting of the association there was much lively discussion over the comparative merits of building material for fireproof structures. Several members argued at length, and occasionally with some heat, over the comparative values of reinforced concrete and terra cotta. William Ham Hall championed concrete and answered the argument of Mr. Johnson of the National Fireproofing Association, who took up the cause of terra cotta.

In order that the experiment station should prove a fair arbiter of the merits of this material, it was urged that several engineers connected with the leading universities on the Coast be engaged to conduct the experiment at the San Francisco station.

Since the Baltimore fire, several of these experiment stations have been established in the large cities in the country. The Insurance Engineers' Experiment Station in Boston is accepted as the final judge of the fireproof values of material used in building in that city. Experts of these stations are sent to study conditions and results in all the cities of the country that suffer from serious conflagrations.

Insurance Investments

By J. T. WALSH, C. E., M. E.*

THE object of this article is to call to the attention of owners, architects and engineers a few important points that should be of some aid in determining upon what lines the reconstruction of San Francisco should take place. The recent disaster through which the city passed has taught us many lessons, as did the Baltimore and Toronto fires, and it remains to be seen if we are going to profit by these experiences. The country, at the present time, is enjoying an era of prosperity, and this is due principally to the progressive spirit of those people who do not hesitate to adopt measures, however radical they may be, which will aid eventually in increasing this prosperity.

At the present time the city of San Francisco, in accordance with this spirit, is commencing to rebuild, and the prospective builder is confronted with many important problems, one of the most important of which is the insurance problem.

The fundamental idea of insurance, in its many forms, is one of protection. This protection can be obtained in two different ways or a combination of both. The most common form of insuring is to deal with an insurance company which assumes the risk, (rightfully named), for a certain period on the payment of a rate which is fixed by the insurance company. This rate is determined by the insurance company after an investigation of the type of building, purpose for which it is to be used, the locality, proximity to other buildings, fire equipment and various other considerations.

San Francisco has always been regarded by the insurance companies as a place of doubtful risks, but in spite of this fact the companies have competed strenuously for the business and secured it, and, with a few exceptions, they now have very little of which to be proud.

The San Francisco conflagration has developed one fact that the other large fires failed to develop, viz., that insurance companies are not invulnerable. They have learned that it is necessary to prepare for great conflagrations, and even now are putting this knowledge to practical use by advancing rates.

It is only fair to assume that this wil continue, and that insurance rates in this city will be for some years to come very much higher than before the great fire. This point is one that interests the owner to a very great degree, as for business reasons he feels that on a large investment he must have some protection. He must know, too, that the insurance companies can reasonably ask these high rates, and that any reduction in them must come through his own efforts. The reasonable thing to do, therefore, is to devise methods which will enable him to reduce his insurance rates to a minimum, and at the same time yield a fair return on the extra investment.

Buildings may be classed, as far as fire hazards and rates are concerned, into three classes, frame, mill or slow burning, and fireproof. Each of these three classes have their proper place, and economic reasons will govern the owner in determining which type to build.

The fire has taught us that we had no absolutely fireproof buildings. Many so-called fireproof buildings were such in name only, and it is safe to say that no modern building is or can be made fireproof without the aid of fireproof materials applied in such a manner as will, to the best knowledge and skill, fulfill the purpose for which they are intended. In order to obtain a strictly fireproof building, we must consider other equipment in addition to that of the building proper. The equipment should be installed and various methods employed to make our structure reasonably secure against both external and internal fires.

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*Mr. Walsh is a member of the firm of Barker & Walsh, consulting engineers, 2504 A Clay Street, San Francisco.

Much has been done and is being done in other cities along these lines, and large industrial concerns are gradually coming to the point where they feel they can safely carry their own insurance, and at the same time have what is styled a safe risk.

Modern methods of construction, including steel and reinforced concrete, the use of fireproof material intelligently and skillfully applied, the installation of automatic sprinklers, with supply tanks on the roof, storage tanks in yards, trained employees to fight fires, efficient watch service, metal doors and shutters, metal window frames with wire glass, inclosed elevator shafts, automatic fire doors and various other devices, are all necessary in order to bring a building within the narrow meaning of a fireproof structure.

The installation of the equipment enumerated has been and is carried out successfully, so much so that many concerns are able to show a large saving in expense, after the interest on the increased first cost and the saving in insurance premiums have been carefully figured out.

Estimates on fire equipment are always available, as are also insurance rates, and it is a comparatively simpe task for an owner to procure the necessary data and then solve the problem.

Large concerns have found that it pays, and it is reasonable to assume that smaller concerns, by the applications of the same principles, can satisfy themselves as to the wisdom of the policy.

In San Francisco the city could also aid materially in reducing rates, by the installation of a sea-water fire system. This would necessitate pumping stations on the bay and the subdividing of the city into districts, each having its own water supply for fighting fires.

An installation along these lines would have the decided advantage of being independent of the present supply, which another earthquake might put out of commission and leave the city helpless again.

Local conditions at present are such that it will be found advisable to construct many buildings along fireproof lines, which construction previous to the fire would not have been justified from a business standpoint.

The saving in first cost, although of great importance, should not be the only consideration. Extra efforts should be made to build with the idea of permanence and safety, as it is only by such methods that the city will establish itself again.

With the vast resources of this State upon which to draw, with a fine harbor centrally located on the coast, and with the progressive spirit for which this city is noted, we should not allow ourselves to be blinded by the present disaster, but should begin to build, not with a penny-wise policy, but with one that in a few years we may look back upon with pride.

The clerk who has to get out of a warm bed on a cold winter morning is thoroughly imbued with the idea that the office should seek the man.

When Happiness came to town he fell in with two bunco-steerers, Inconstancy and Fickleness. One took his cash, and the other gave him in return a gold brick.—Ex.

Rebuilding a Great City and the Part Taken by a Big Construction Company*

The "Algonquin," New York, Thompson-Starrett Company, Builders

IT is only the other day that "skeleton construction"—the system of erecting buildings around and upon a steel framework—became an actual industry. Twenty years ago it was unthought of. Little by little it has dawned upon men, who paused in the street for a minute from day to day to observe the progress of a building that a revolution was being wrought in the oldest craft in the world. Now it is hardly a thing to surprise any one to see a part of the walls in place, several stories above ground, with nothing but some spindling steel uprights underneath to support them. A few years ago that very thing was one of the sights of the town. A demand brought into being this method of construction, which has become almost commonplace to the people who occupy the buildings as they stand today. There are inspiring things in business, in the application of brains and toil to the work to be done, and this change has a history that has even romantic aspects.

For hundreds of years the building industry had progressed little, if at all. It had lost ground rather than gained it, to judge by standards of skill and efficiency. Then came the need of more stories in buildings. Five and six floors on a lot of high value made office room too expensive. The skyscraper was called into being. To build it an entirely new order of ability had to be called into play. The problem was worked out by the engineers, for to the old craft of the artisan had to be added the knowledge of the bridge-builder and that genius in fitting means to an end which Americans are content to describe by the homely word, "gumption."

The modern skyscraper, that structure which, compared to the old-fashioned building, is as the great ocean liner to the sail ship of the olden days, requires ability in constructional engineering, mechanical engineering, electrical engineering, sanitary engineering, a complete mastery and adaptation of the skill and knowledge of many suddenly grown arts and trades and their adaptation to the new "creature" which was so odd when first brought into being, and is so necessary and taken for granted in this year of civilization.

The great construction company of today may be briefly defined as an organized body of engineer-contractors composed of specialists in the different lines of modern building construction. It has grown gradually in answer to the modern demand that the different operations which are involved in the construction of that single thing—a building—shall be conducted under one management, exactly as the department stores have been developed in the world of merchandising.

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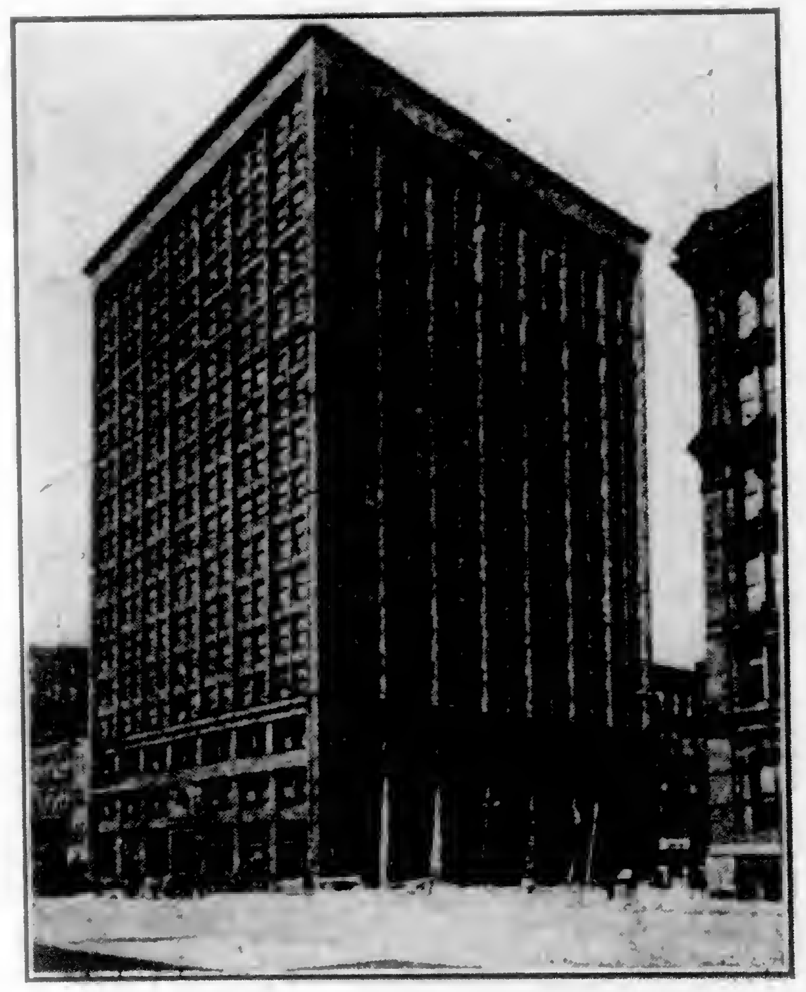
*There is such a company in operation now in San Francisco and the article printed herewith is a faithful description of the organization and mode of operation of the Thompson-Starrett Company of 2053 Sutter Street, B. C. Dickinson, manager.—Ed.

The idea of this organization is no new thing. In ship-building it has been regarded as impossible, and indeed it has been impossible to construct a great ocean liner except by a complete organization under one ownership and control. And so the ship-building business has grown under systematic and orderly management to a point where a single ship of today can carry in one cargo a greater bulk or tonnage than could ten of the greatest liners of twenty years back, or than a hundred of fifty years ago.

The difficulties in the way of establishing a single organization for building on land have been far greater than those which were surmounted in the case of ship-building, but the principle is the same, and it has won, as it was bound to do.

Forty trades, more or less, are engaged at one time or another in constructing the skyscraper. Four great departments of engineering are involved in the structural designing. To bring all these under one management, in the face of the opposition of the advocates of the older system of dividing the construction work among anywhere from a dozen to the full forty independent contractors has been no easy task.

Big construction companies at present only seek the work of building Class A buildings, which are, of course, only required on ground which is very valuable. Such undertakings, involving the expenditure of a large sum on each single operation, and requiring, as they do, a total suspension of all income during their construction, have demanded as the first essential speed, so that interest charges may be reduced to the minimum, and oftentimes so that the renting season of each year may be safely met. The saving of time may therefore be said to be a sine qua non in the construction of the skyscraper. The older system was found to be a time-saver only under conditions where expense was no object. It was in answer to the demand for time-saving, with economy, that the present organization has grown.


Rockefeller Building, Cleveland, Thompson-Starrett Co. Builders

How is it carried out? To give an idea of the scope of the organization, it should be explained that the business is divided into three heads, Executive, Accounting, and Legal. The Executive head controls seven departments of (I.) Construction, (II.) Purchasing, (III.) Drafting, (IV.) Civil Engineering, Designing, (V.) Mechanical Engineering, Designing, (VI.) Selling, and (VII.) Estimating. Each of these departments has its divisions down to the smallest practical detail.

The Construction Department, for instance, is divided into two main divisions, the first being the Superintendent's division, which includes (I.) payroll work, or work done direct by mechanics employed by the Company, and embracing fourteen different lines,

which under the old system would mean fourteen different interests to deal with, and (II.) sub-contract work, i. e., work done by sub-contractors. The second division of the Construction Department includes the four engineering lines without whose help no modern construction can be done. These are the Civil, Mechanical, Electrical and Sanitary Engineering Departments, which are concerned respectively with the foundations and steel skeletons; the heating and ventilating systems; the electric lighting plants and the sanitary systems.

Under the pay-roll work the company handles at different stages in the construction of a building fourteen different trades. This employment of numerous trades is a feature of the management which has been found to be in very truth the open sesame of a new order of things in the industrial world, for almost all trade disputes and other building trade troubles have been found to grow out of the jealousies arising between different independent employers' organizations, which formerly undertook to keep each department of a building by itself. The department store idea, as it has been called, does away with all this, for the very good reason that the employer of all the trades has no axe to grind for one trade as against another.

In Division I. are fourteen trades. The work under those heads is done altogether by mechanics "on the pay-rolls" of the company. In Division II. the work is let to sub-contractors, supervised by Thompson-Starrett men, but all the material for the pay-roll work is purchased and supplied at the building by the Thompson-Starrett organization.

It will thus be seen that every part of the construction of a building is first studied out beforehand, in the drafting, civil engineering and mechanical engineering departments. The selling department negotiates with architects and owners for the business.

When the contract has been undertaken the superintendents begin to mass their forces at the work. A time schedule is furnished them. The cellar must be done by such a date, the foundations so many days later, and so on until the elevators are running, and the tenants move in. The time schedule is adhered to as closely as that of a railroad train.

The concern maintains extensive yards for material in the cities where it happens to be engaged, and drafting rooms on an elaborate scale.

One of the valuable elements of the business is the knowledge of cost, which is kept up by the records of the company, covering the millions of dollars' worth of work done, as well as millions estimated on. Builders who trust to sub-contractors for everything, as the general custom is, can not have this accurate, up-to-date information.

Architect A. F. Rosenheim's Impressions of San Francisco

"NOBODY can design a building to stand against such elements as an earthquake, because of the impossibility of figuring on its intensity," declared A. F. Rosenheim before the regular monthly meeting of the Southern California Chapter of the American Institute of Architects, at Los Angeles.

Granting the admirable manner in which the best modern buildings of San Francisco stood the shake, Mr. Rosenheim argued, logically enough, that no human being can foresee the degree of intensity which may mark any seismic tremors.

Discussing expert opinions on the successes and failures of modern types of building construction, as exemplified in the recent disaster, he declared that no revolution in building construction need be expected as a result.

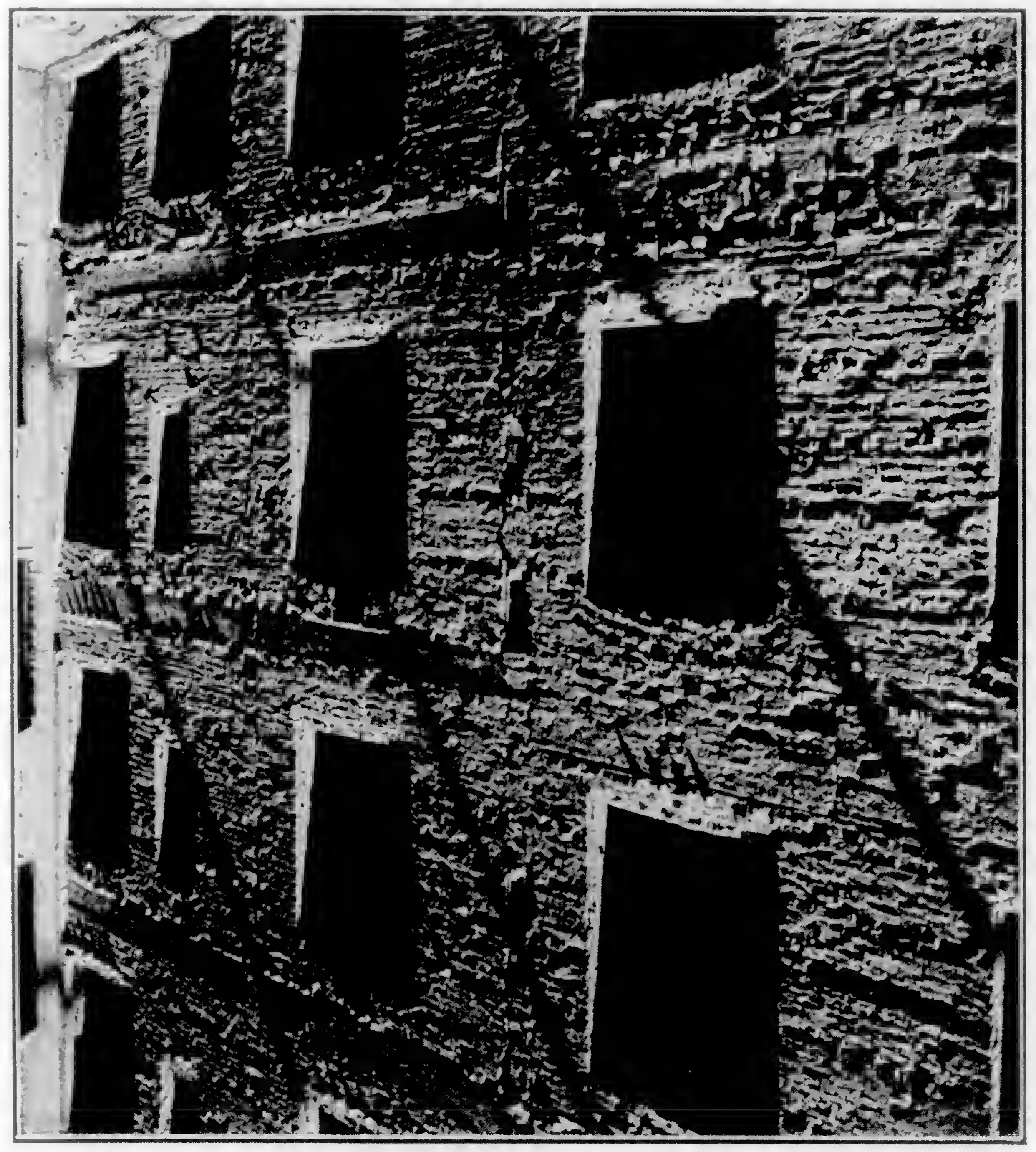
"The best buildings today are probably as well constructed as they will be for years to come. The only question is of the ability of the architect to persuade his client to allow him to build as well as he knows how.

"Unfortunately there is bound to be in San Francisco a repetition of the class of construction they have had heretofore. Architects are bound to be hampered by financial considerations on the part of their clients, and the result we can all guess."

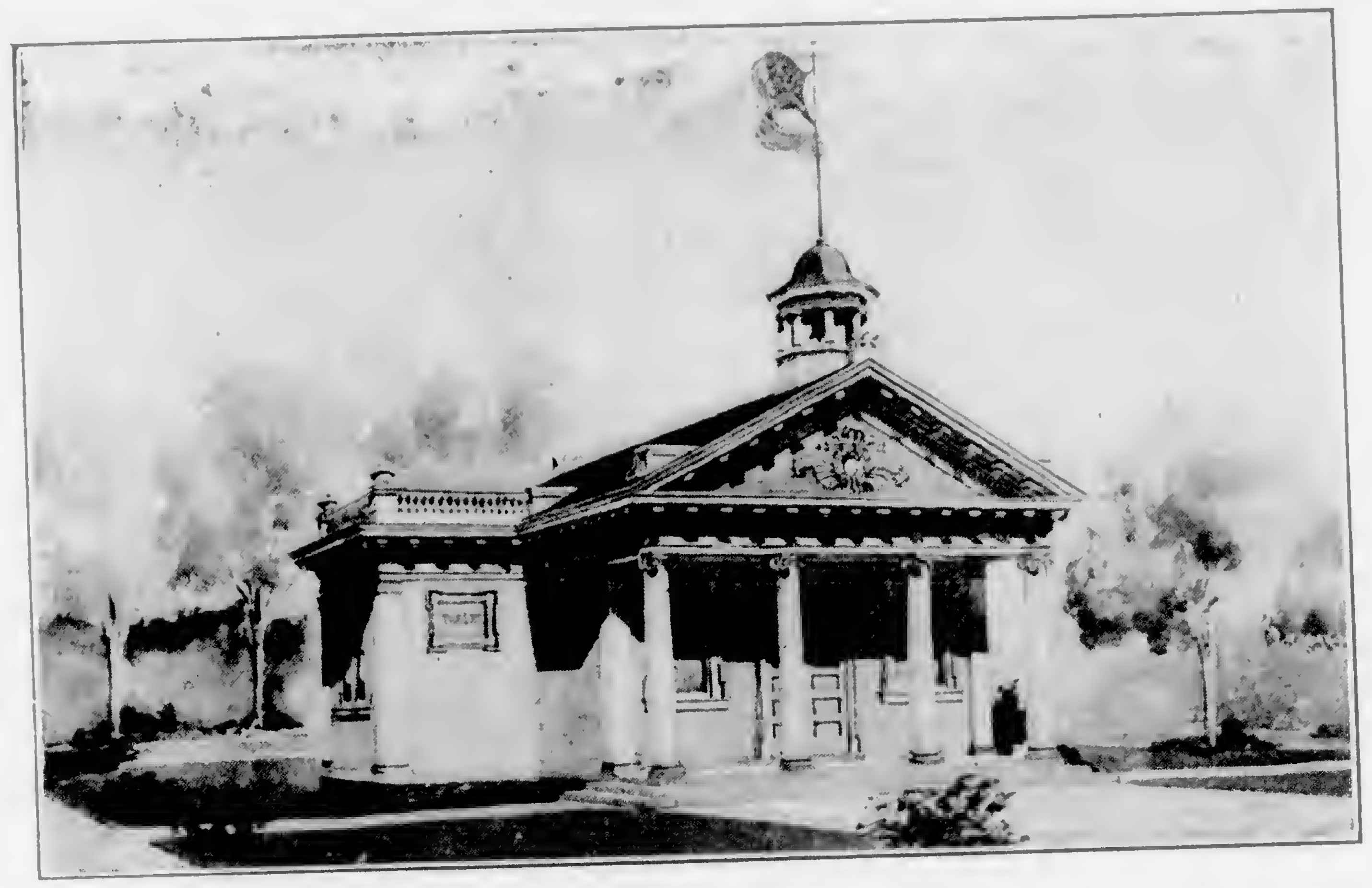
In referring to a trip of inspection about the stricken city Mr. Rosenheim said: "I failed to see wherein the buildings of ordinarily good and honest construction in any wise failed, and as for those that went down in the earthquake, they had no license or excuse for standing at all."

Mr. Rosenheim's talk developed very clearly that he does not hold the form of reinforced concrete structure, so popular in Los Angeles, in high esteem. This attitude provoked a storm of animated, if not heated, discussion, as the resident architects are strongly and radically divided on this much-mooted question.

While unable to find in San Francisco any examples of the concrete structures erected in Los Angeles, Mr. Rosenheim and his companions examined carefully the reinforced concrete floors of the fine Wells-Fargo building, and discovered that in many instances where the flames had come in direct contact with the concrete slabs they had burned entirely through.



Court of the St. Francis Hotel. A Sample of Poor Brick Work



One-Room School in Classic Style—Built of Wood W. H. Weeks, Architect

Rural School Buildings in California

By W. H. WEEKS, Architect

PLANNING a school building has come to be one of the most important and exacting problems of the district school trustee, yet not a few trustees appreciate the fact. As a result it is not uncommon to find a country school sadly lacking in such essential features as high-class construction, lighting, heating and sanitation. This, no doubt, is sometimes due to financial limitations, but more often it is due to a lack of knowledge of the accepted rules and principles of modern school sanitation and construction.

It is my privilege to point out some of the ways by which the country school can be made more sanitary, convenient, and artistic.

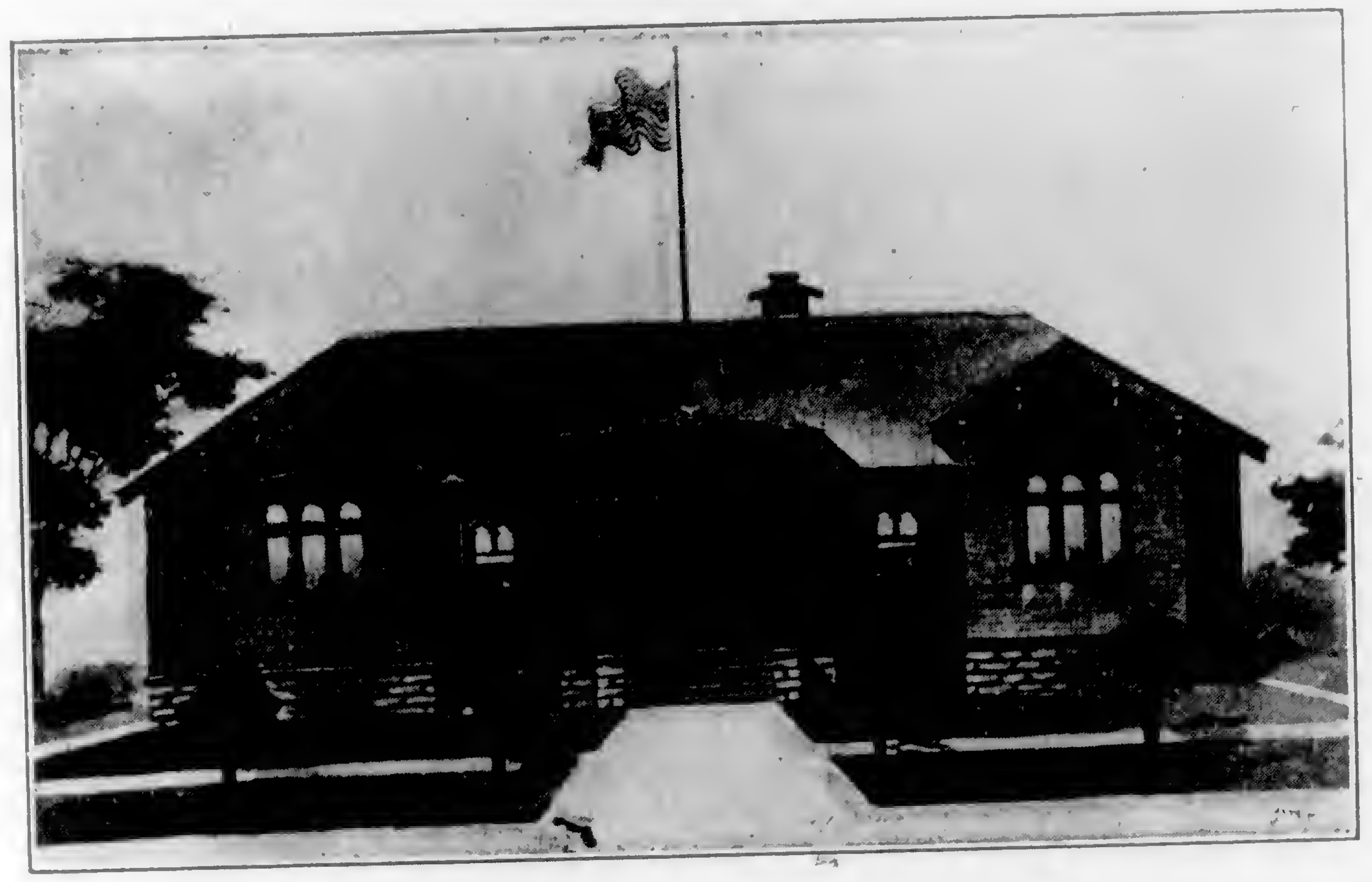
Before planning the building it is necessary to provide the site. This should be centrally located, on high ground, if possible, where good drainage is assured, and where the purest air can be obtained, always remembering that the locality admitting the east light into the class room is the one above all others to be preferred in this climate.

In regard to the requirements of the model country school—and when I say requirements I have in mind the fact that where expense enters so largely into the problem it is impossible to have everything as we might wish. Still there are certain necessities that we cannot overlook, and many desirable features that should be incorporated in the school so far as our means will permit.

In planning the building the first consideration is the floor arrangement, which should be well studied so as to get the most convenience within the least possible space.

In studying the floor plan, the class room necessarily receives our first attention. It should be made the size required to accommodate the number of pupils who are to occupy it, allowing not less than 15 square feet of floor space to each pupil.

Where the light is from the left side only, the room should not exceed 25 feet in width and not over 32 feet in length. Too great a length should



Design for a Two-Room Building W. H. Weeks, Architect

be avoided. In France and Germany the maximum length of a school room is 30 feet. This is the distance to which the average voice will carry with ease, and the pupils in the back part of the room can easily read the writing on the front blackboard.

In connection with every school building provision should be made for a small room for the use of the teacher. This of course will incur a little additional expense, but it is money well expended, as this is a very essential part of the building.

Rooms must be provided for the hanging of cloaks and hats. Making use of the halls and class rooms for this purpose is not only unsightly, but unsanitary. The cloak room should not be less than 5 feet wide and should have outside light and ventilation. Numbered coat and hat hooks should be provided, placed in alternate heights of 4 feet and 5 feet for the accommodation of the different sized pupils; also shelves for lunch baskets and rubbers. It has been demonstrated that this room when placed in direct connection with the class room is more convenient, and under closer supervision of the teacher. In this arrangement also the ventilation in the winter months is more easily provided for.

A small heated and ventilated locker should also be provided in the cloak room for drying damp clothing if the heater adjoins the cloak room.

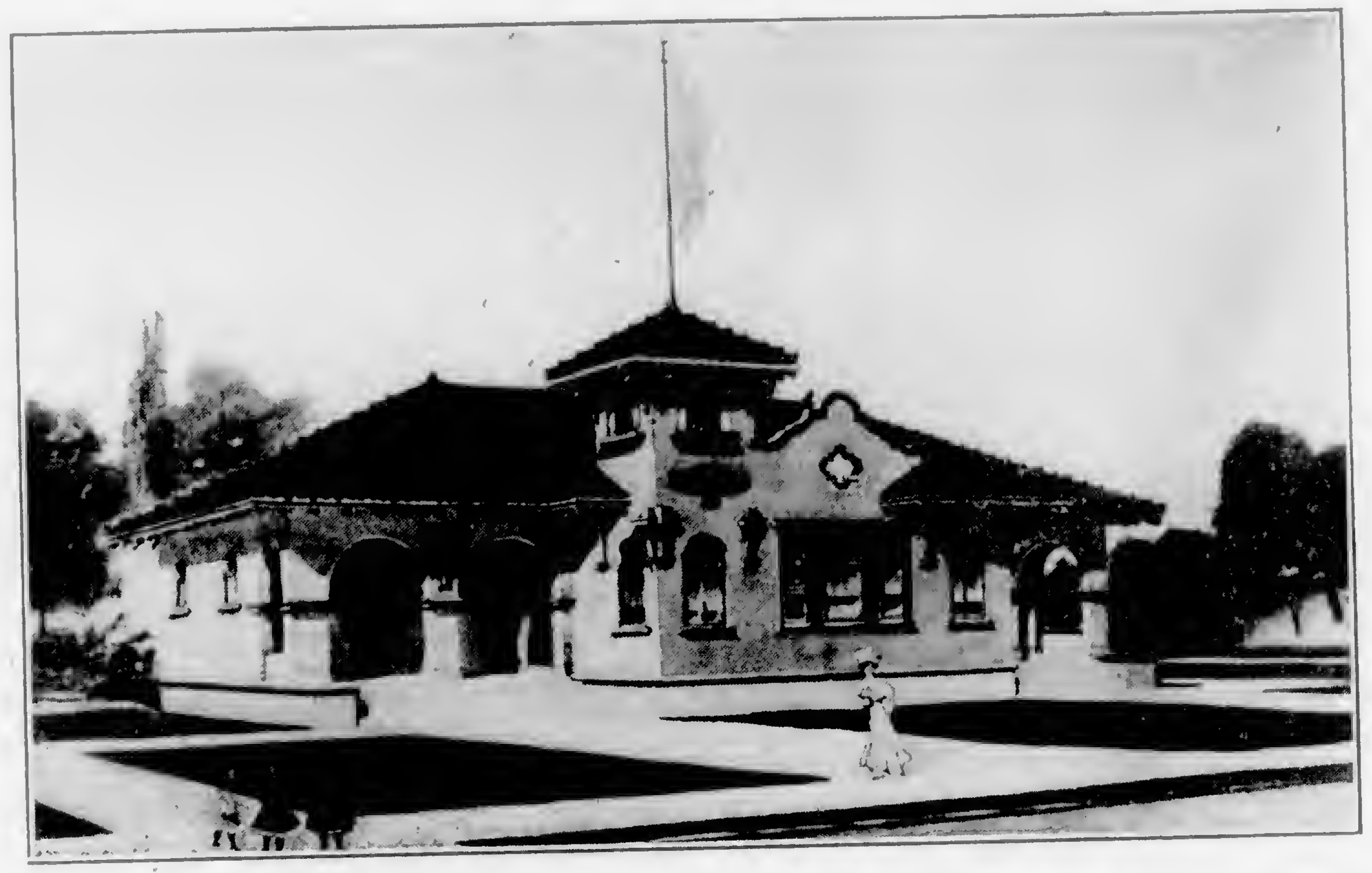
The halls should be of ample size so that there will be no crowding of pupils.

All ceilings should be 12 feet 6 inches to 13 feet high.

The question of heating and ventilation is a very important one and should receive the closest attention from the school trustees.

When we consider that all the best authorities on school architecture state that no less than 30 cubic feet of fresh air per minute should be furnished each pupil in a class room, we realize more fully the conditions under which the children labor in all poorly ventilated schools. There are several dangerous elements in vitiated air, but the fact that children are often afflicted with contagious diseases is one of the most important reasons for providing good ventilation.

The elaborate heating and ventilating systems, such as are used today in the modern, up-to-date city schools, where a blower is used in combination with air filters and automatic regulation of temperature, are very expensive. They cost too much to install and operate in a small country school where similar results can be obtained at a reasonable expense by the use of jacketed stoves or heaters in which fresh air is introduced through a conduit from the outside. In fact, the conduit should come from two sides of the building in order to get the best results. The conduit should be provided with dampers that can be easily operated from the school room. The air should come up from under the heater and between the stove proper and the outside covering, entering the room from the top. The foul air is then taken out through a vent flue, through which the smoke pipe is carried. Since the cold air falls toward the floor, the outlet should be placed in the wall at the floor line. The pressure of the fresh heated air thrown up into the room from the stove jacket will force out the foul air through the vent below. The vent flue, being heated by the small smoke pipe passing through causes an upward draught that carries the foul air to the outside. A number of heaters are made for this purpose and can be purchased at a reasonable cost.

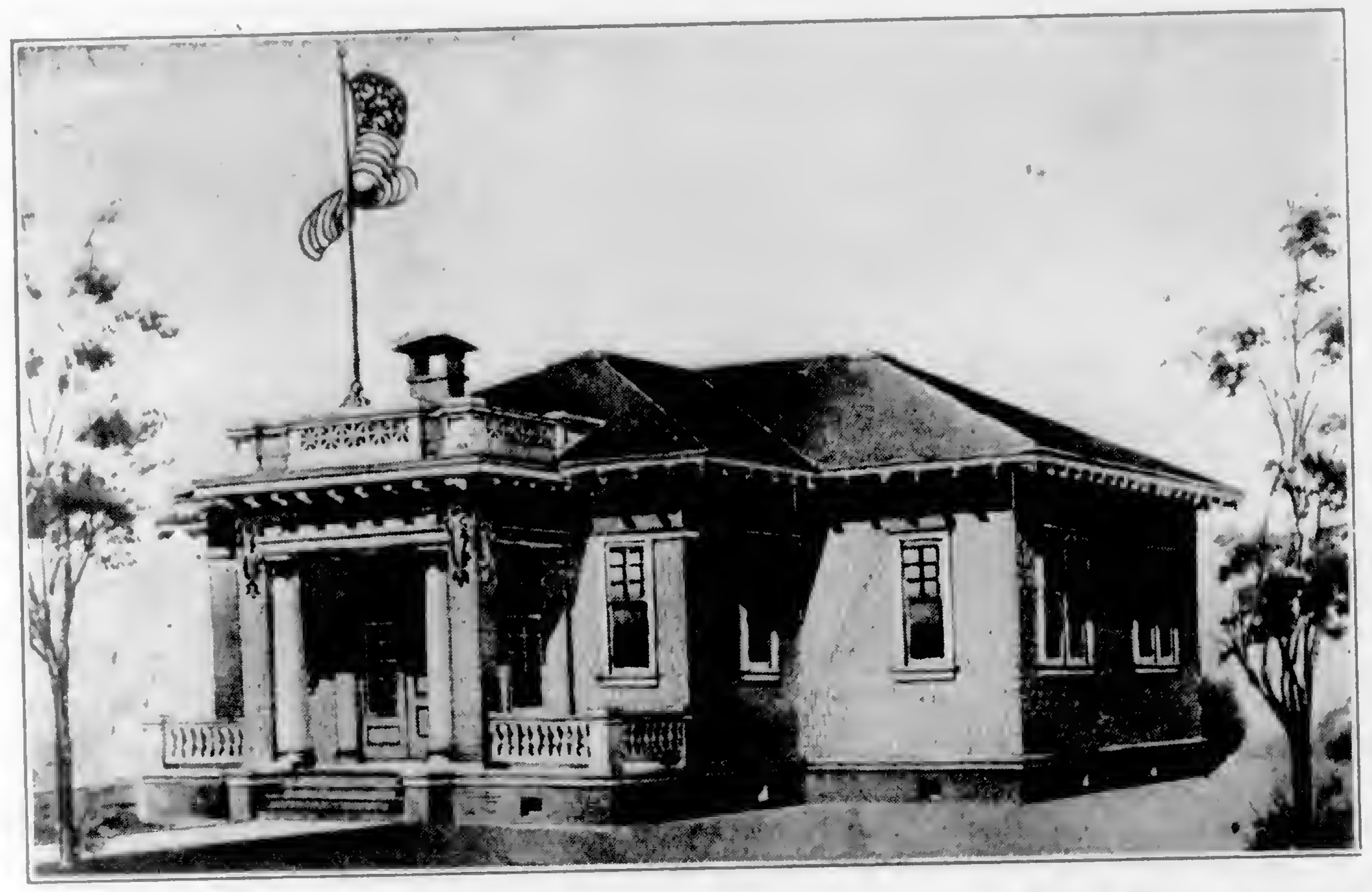


Design for a Two-Room Building in Mission Style W. H. Weeks, Architect

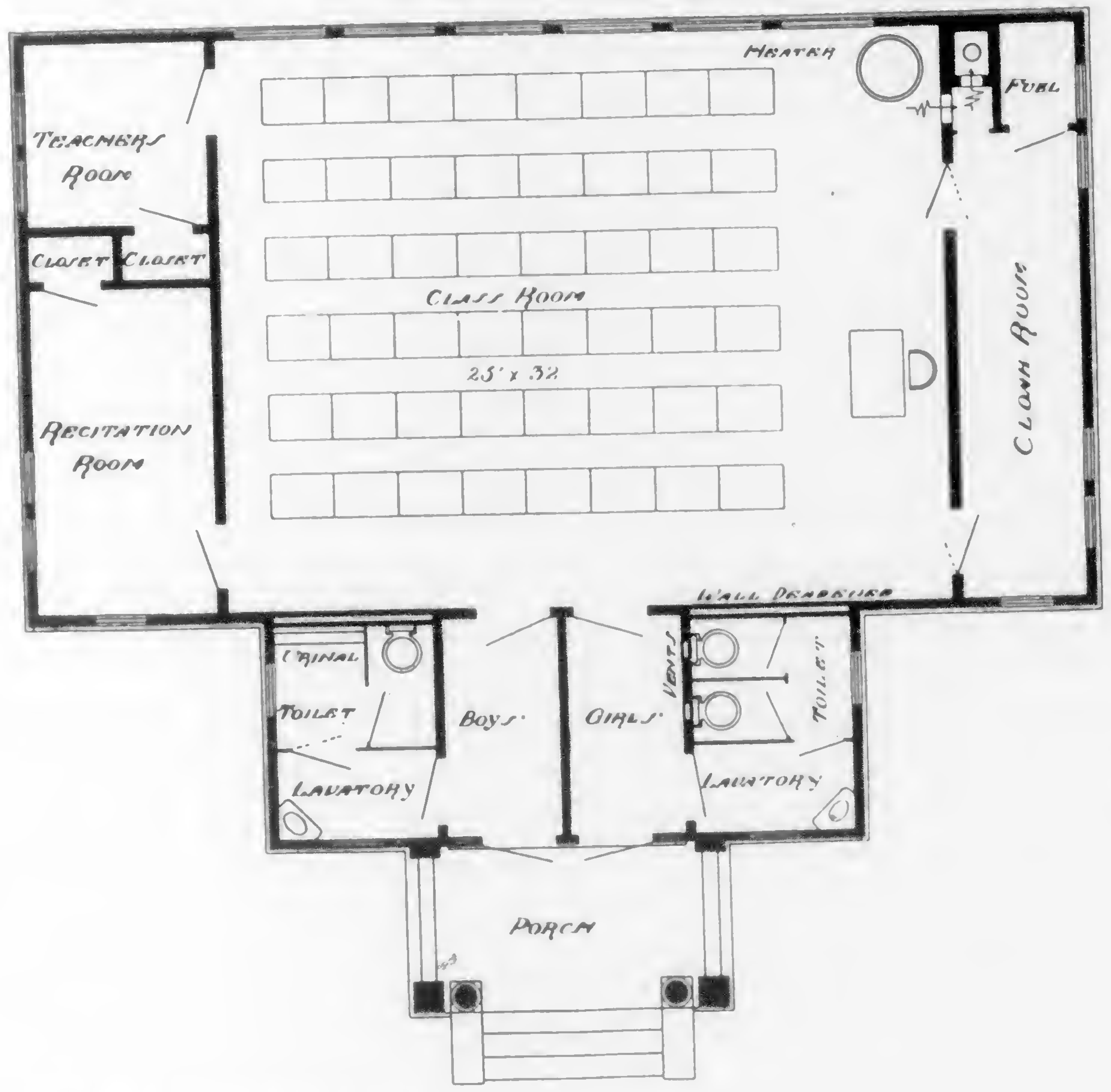
If the district is too poor to secure such a heater, then the stove can be encased with a metal jacket, providing for doors and other necessary openings and a fresh air inlet below. This jacket can be made easily and will be a great improvement over the naked stove which should never be used in the school room.

In regard to blackboards, there is a strong prejudice in favor of slate, on account of its durability. When the very best quality of slate is secured there can be no question as to its merits. The initial expense is, however, much greater than that of composition boards, which answer the purpose about as well, can be obtained in better lengths, and are much more easily applied. These advantages, together with the color—a pleasing shade of green—make the latter boards all that can be desired. No board should be accepted without being guaranteed by a responsible dealer or manufacturer.

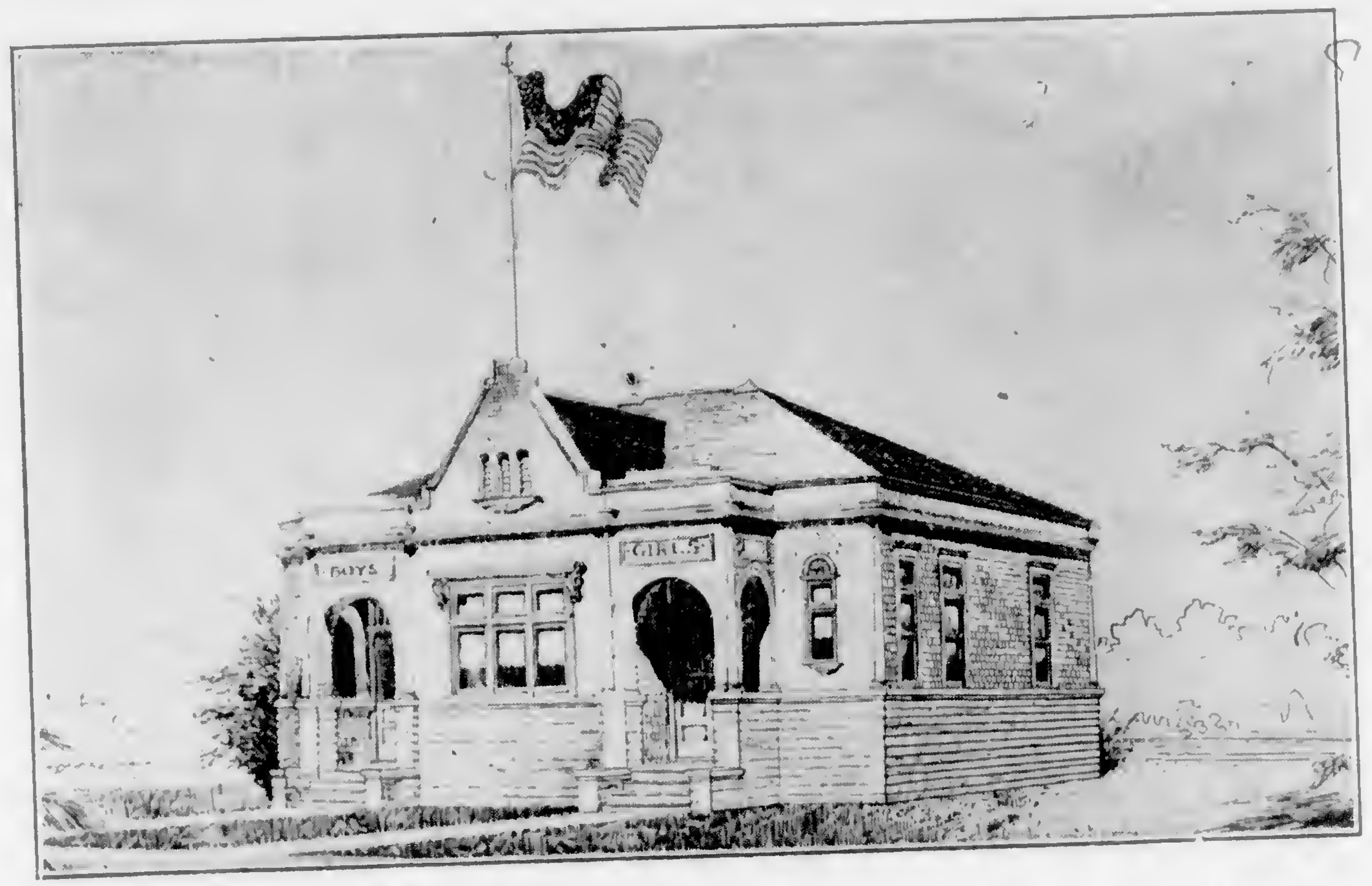
Hyloplate and other similar boards should be glued to a 1-2-inch board backing in order to get the best results. The Parshall green artificial slate has proved to be a very satisfactory board. It is really a slating which is applied either directly to the plastered wall, to heavy Manila paper



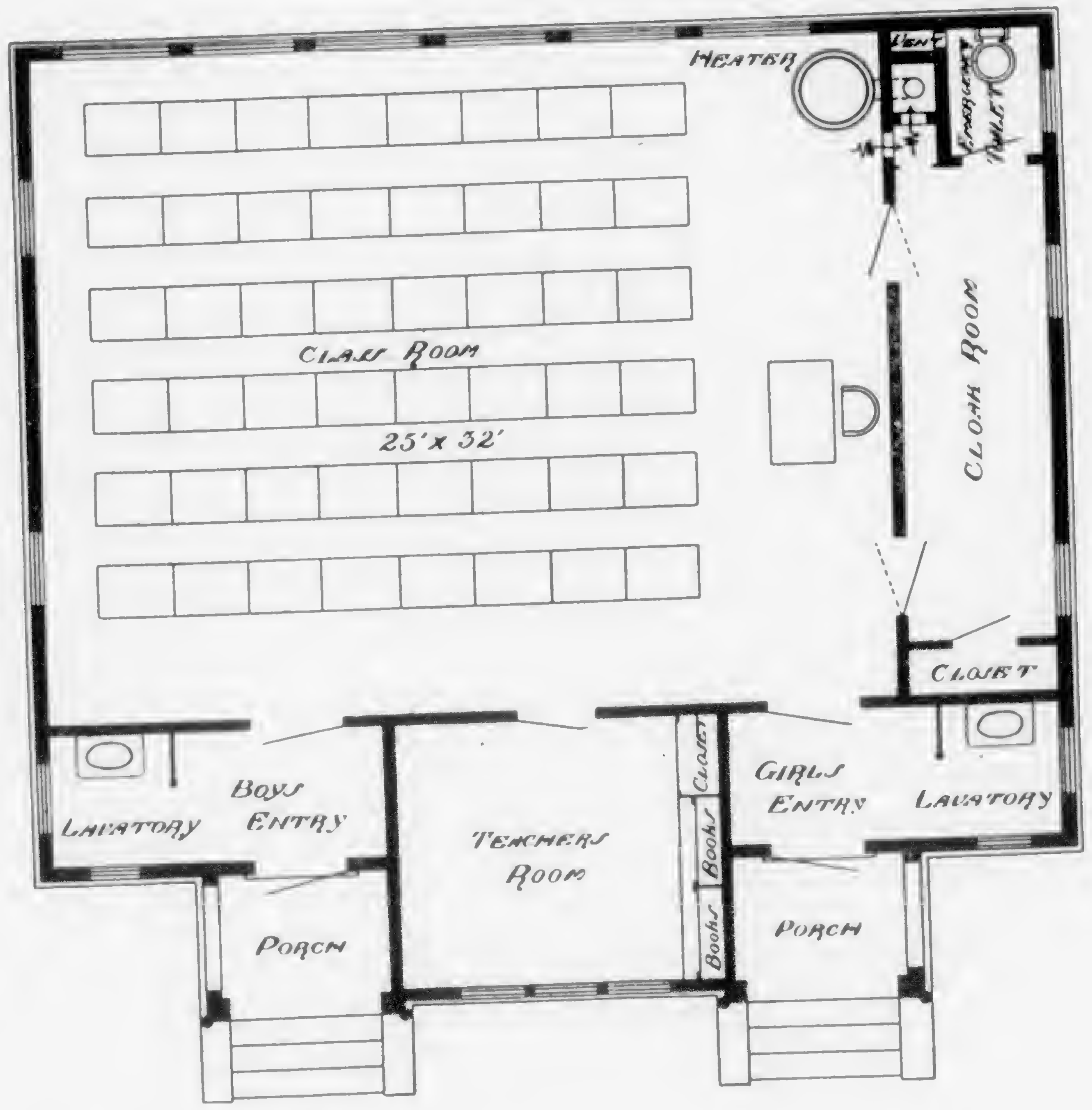
Exterior of Plan No. 1 W. H. Weeks, Architect



Plan No. 1 for One-Room Building



Exterior of Plan No. 2 W. H. Weeks, Architect



Plan No. 2 for One-Room Building

glued to the wall, or to wooden boards. Much care must be taken, however, in preparing for this or any other artificial board of this class to see that the walls are properly seasoned and prepared before the preparation is applied, otherwise the board that ordinarily would prove good might prove unsatisfactory. A still cheaper form of blackboard is manufactured by the use of hard plaster and paint, but it is too easily damaged to be seriously considered.

Blackboards should be 2 feet 6 inches from the floor and from 3 feet 6 inches to 4 feet wide, with an extension back of the teacher's desk of two extra feet.

Grooved chalk rails should be provided under blackboards. Over the top of chalk rail, or rather 1-2 inch from the top, there should be a galvanized wire mesh cover, so that chalk dust can settle through and save the chalk and erasers from being covered with dust. The cover should have a wired edge and be made to open out for cleaning.

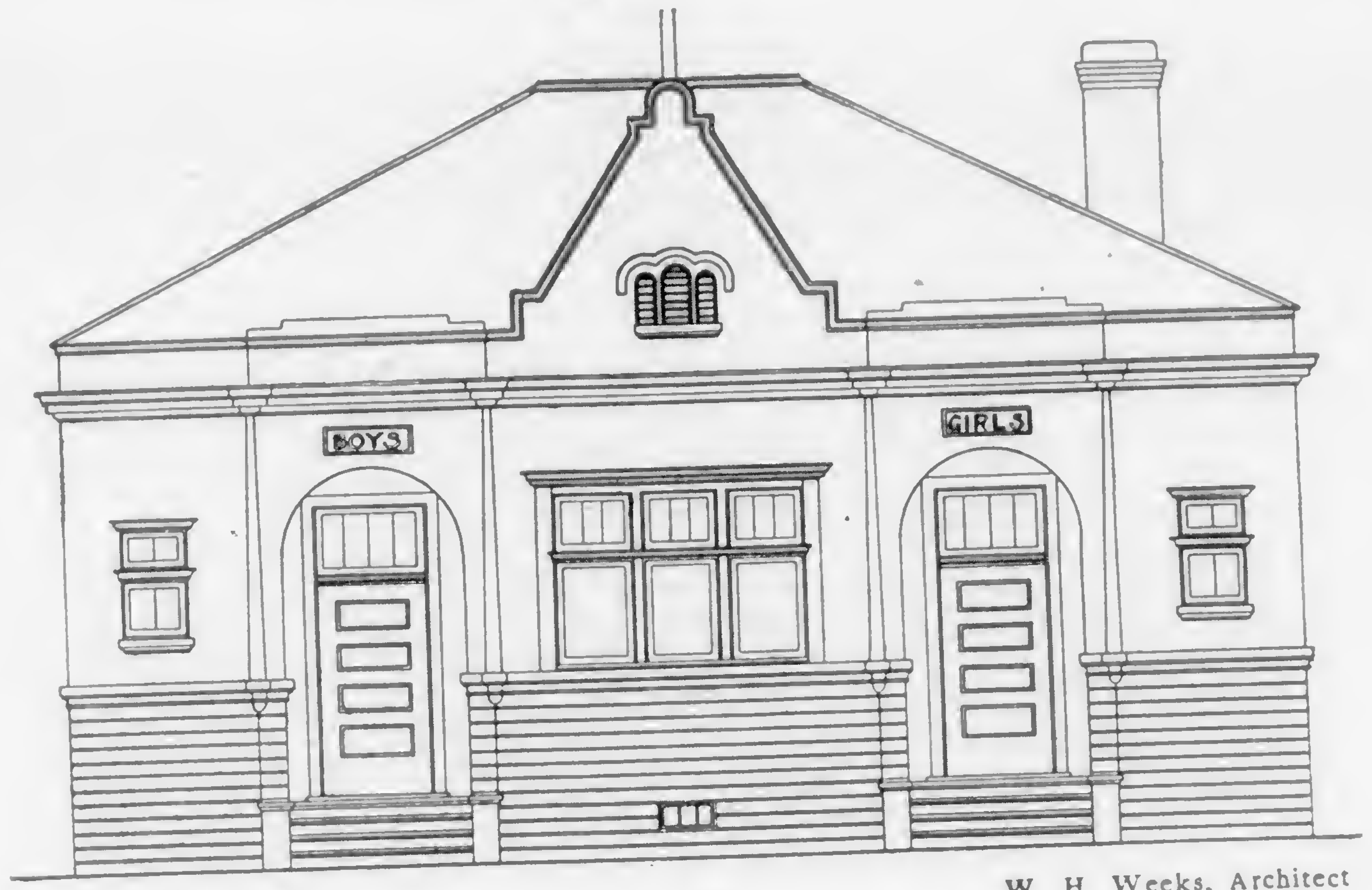
The lighting of the class room is the most important problem in school building. Under no circumstances should a pupil be forced to face the light, and in the best planned school rooms the teacher is equally favored. The only proper lighting is that introduced over the left shoulder of the pupil. High lights over the blackboard in the rear are better omitted, but are frequently used for architectural effect.

The glass surface should equal at least one-fifth the floor space and the windows should not be less than 3 feet 6 inches from the floor, coming up as close to the ceiling as the casing and finish will permit. The best glass only should be used, divided where necessary to provide for the proper degree of safety from breakage. Sheet prism glass can now be obtained at a reasonable price and I would recommend its use in the upper lights of the windows, or at least in the transoms, for by its use the light in the room can be made more uniform.

The shades should be of the best quality and be made double; placed at the center of the window so as to work up and down. The edges should be reinforced and run in groved pieces so as to prevent a glare of light entering between casing and shade.

There is no good reason why toilets and other conveniences in the plumbing line should not be used in connection with the country schools. The principal trouble heretofore has been in the water supply and drainage; but the water supply can easily be taken care of by means of a pneumatic tank, placed in the ground near the building, and a force pump properly connected with the tank of the building. The size of the tank must be graded to suit requirements—say about 200 gallons to a class room. It will then be possible to have running water to all fixtures, sinks, toilets and basins—all of which can be relied upon. The toilets for the use of scholars should be automatic.

The question of sewage disposal has of late years become a simple matter. Formerly it was necessary to resort to draining into ditches, cesspools, and streams. Now, however, there is no occasion for these, for by the use of the Septic System of Sewerage, which is considered the only scientific system in use today, all sewage can be readily disposed of. Double cisterns are built and connected under ground. The first cistern is divided into two compartments. The first compartment or settling chamber receives the sewage, the liquid portion of which flows in a sheet into the second compartment. This in turn flows into the large flush tank, where, when the water reaches a certain point, it is automatically syphoned off into a drain pipe leading to a point where porous terra cotta pipes are run out in different directions. The sewage is distributed through the open joints of



Front Elevation, Plan No. 2

W. H. Weeks, Architect

these branch pipes, which are not more than 14 feet below the surface of the ground. At this depth the sewage will be oxidized. This arrangement can be simplified so as to give satisfactory results at a very little cost.

The woodwork on the interior of a model country school should be as plain as possible, omitting all fancy moulds and quirks, as they are only dust catchers and add to the expense. A natural finish makes the wood more beautiful and desirable. The different rooms should be wainscoted to the specified height. The plastered walls and ceilings should have a good sand finish, as it is more sightly than hard finish, and is freer from cracks where protected by wainscoting. The tinting shows to much better advantage when placed on such a surface.

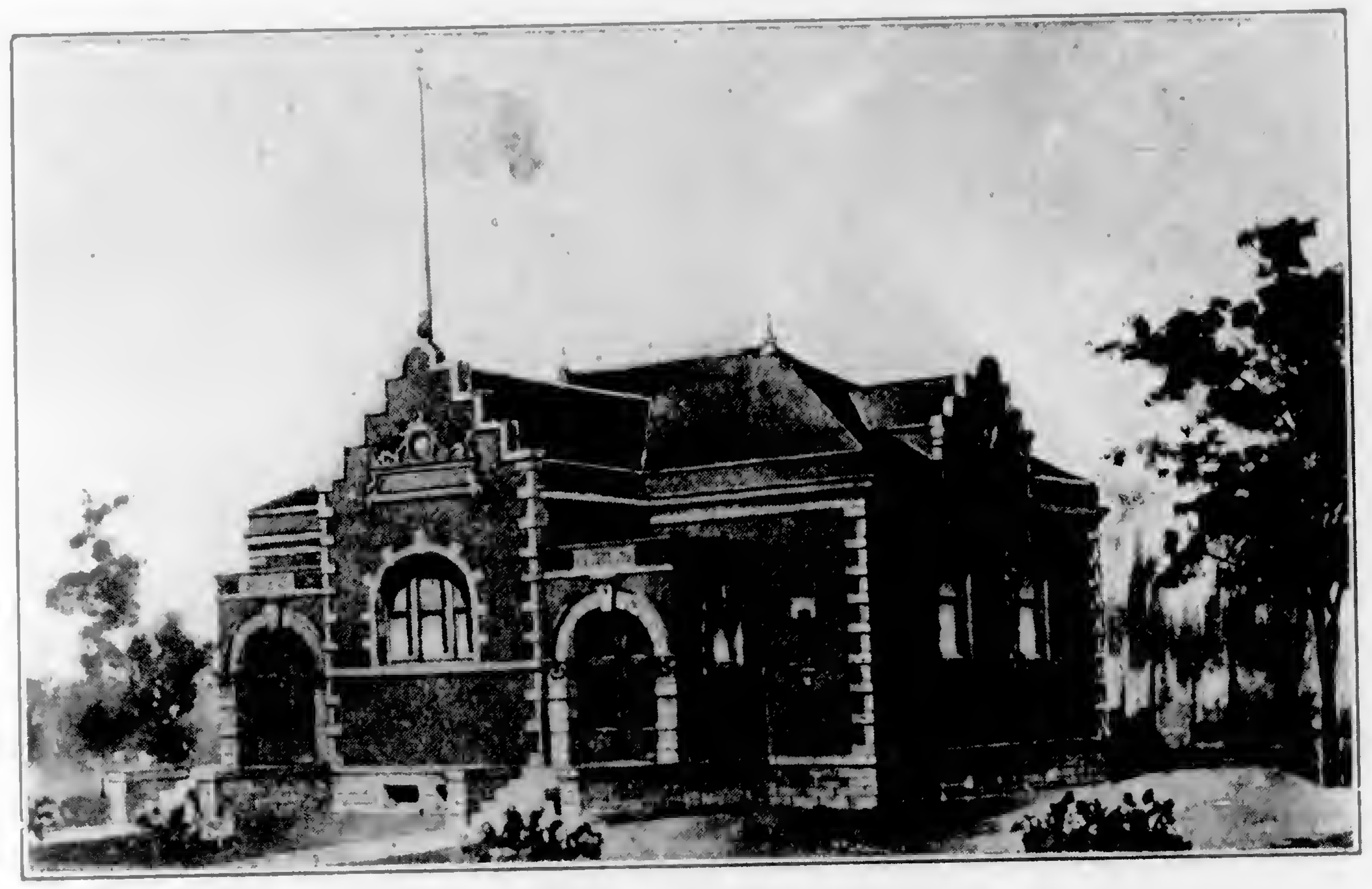
The color of tint for walls and ceilings should be selected to harmonize with the wood finish and blackboards; the exposure should also be taken into account. Light olive green is a very good color for an eastern exposure, but if green blackboards are used, the painter will find difficulty in getting the shades to harmonize. Rather than risk having the shades clash, it would be better to use some soft shade of brown or tan, with a light cream ceiling.

After planning the interior of the building and providing the necessary hygienic demands, we take up the problem of the outside appearance.

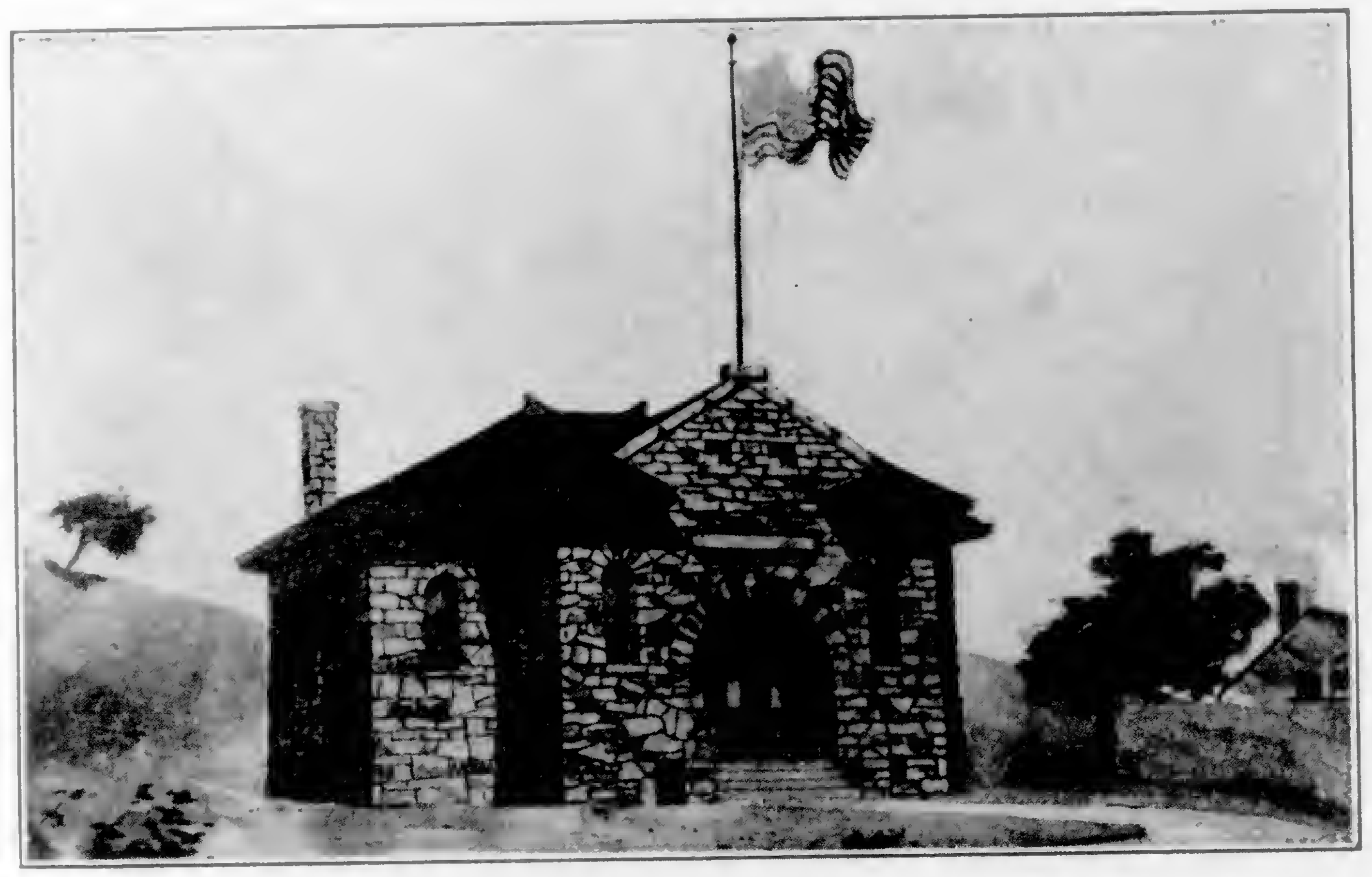
A building erected for any purpose should indicate its essential use by its appearance, especially a building designed for educational purposes, which should not only indicate its use by its appearance, but set an example of good taste and dignity for the community. A school building so designed will cultivate in the young that perception of proportion and relation to utility and adornment that constitutes taste in architecture and will fulfill a large part of its mission.

In the small country school as well as the schools of the large cities the best examples of architecture should be seen. The building should not be elaborate in detail, nor yet severely plain. Still it must have beauty, grace and dignity, be symmetrical in outline with well proportioned parts and with as little ornament as the style employed will justify.

The quality of the material to be used in the erection of the building will depend largely on the locality. Wood has been used almost exclusively



Village School in Dutch Style—Brick Veneered with Concrete Block Trim W. H. Weeks, Architect



Design for Small One-Room Building—Built in Field Stone W. H. Weeks, Architect

for buildings of this class, but there is no reason why brick, stone, or concrete should not be used in localities where these materials can be cheaply obtained. The cost is slightly more than wood, but the building is far more durable. All buildings other than wood should be damp-proofed.

Heating, Lighting and Electrical Work

The Lighting of Temporary Buildings

By C. E. ROESCH

CRITICS, like the contagion of a fever-infected swamp, increase and multiply with the rapidity of a plague, at a time like that which we have just experienced, while those who do and dare are as scarce as the silver wolf, whose appearance in the pack signifies the return of peace and harmony.

Much has been said and written as to the advisability of erecting temporary structures, with advocates both for and against the placing of cheap wood and galvanized buildings on the sites previously occupied by high-class buildings, but the suggestion advanced by Mr. A. Dodge Coplin in his aptly drawn comparison between the Baltimore and San Francisco fires, in the May issue of the Architect and Engineer, in which he calls attention to the wasteful haste with which Baltimore was reconstructed, and permitted buildings to be erected with so little regard for stability that they "are held up by the adjoining buildings to attest to the inadvisability of the excess of so good a thing as hustle."

This phase of the question is one which should command the greatest consideration. It would seem decidedly better to put up an inexpensive "shack" to provide for the immediate needs of the various business interests, giving owners of property an opportunity to think carefully as to the type of building most suited to their needs, thus avoiding the mistakes which Mr. Coplin points out so clearly were committed in the rebuilding of Baltimore. This means a slower process of rehabilitation, perhaps, but a city is a thing for all time, regrets are vain, and it were better to go slow and well, rather than hastily and do things which in a few years must be undone.

Even with this point determined on, many problems confront the builder, not the least of which is the question of artificial light. The most practical means of illumination is dependent on many points, such as the purpose for which the building is to be used, if for mercantile purposes, the kind of goods to be displayed, the kind of illuminant which is most accessible and which will give the most satisfactory light at the least cost.

As these buildings are intended to serve for a limited time only, the lighting instrument should be as inexpensive as is consistent with service.

Some of the various modes of lighting which have been adopted recently have proven successful; one fault, however, is due to the fact that the quality of light has not been given sufficient attention, as, for example, the use of electric arcs in the display of dress fabrics is a serious error, for the decided violet color of the light and the absence of red rays changes the entire prismatic scale. This is not true of the gas arc or the Nernst lamp, the latter being one of the truest artificial illuminants for the preservation of colors.

The most satisfactory method of lighting, and one which serves most purposes equally well, is the regulation 16-candlepower lamp. Its abuses rather than its uses has prevented it becoming generally approved, but when the proper regard is given the area to be lighted, and the lights are most advantageously placed, the result is more efficient than any other plan of illumination. It is quite possible, with the use of high-grade lamps and accessories in the nature of highly reflecting shades to obtain a degree of illumination for a given expenditure of current, equal to these other forms of lighting, and at the same time providing a superior device as to simplicity and reliability.

The lighting of a temporary structure is hardly within the realm of the "illuminating engineers," but if the following plan is carried out, the result should be eminently successful.

As an illustration, we will undertake the lighting of a building 50 feet front by 120 feet deep, to be used for the display of general merchandise. Place six openings in the ceiling, from which should be suspended, at a distance of 7 feet from the floor, pendants of five or six 16-candlepower clear lamps under 16-inch opal reflectors, with single light pendants in the windows, carrying the new high-efficiency lamps with their prismed reflectors. These pendants should be short, close to the ceiling, and, when the contents of the window calls for an unusually brilliant light, the mirrored trough reflector should be placed in the front angle formed by ceiling and window. This arrangement is also satisfactory for a restaurant or cafe, with additional lights from the side walls, arranged in two light brackets, one over each table, the bulbs pointing down at an angle of 45 degrees, fitted with reflecting shades. If these brackets are placed about 5 feet 6 inches from the floor, those seated at the table will be relieved of any intensity of light in the eyes. Stud lights, directly against the ceiling, aid in the general illumination.

The prime consideration, therefore, is equal distribution to provide uniform illumination, rather than strongly concentrated spots of light.

It is a sensible precaution to provide these reflector fixtures with arms for gas, as an emergency feature; these arms, fitted with incandescent gas burners, will be found of great assistance in the event the electric light fails.

Architectural Criticism by a Country Editor

The following breezy description is from the Tribune, of Britt, Iowa:

"The architect changed the specifications on the new building on the corner in front of the Treganza furniture store, and instead of building it two stories high, they built it two stories long. He also changed from a solid brick to a veneered building. It is veneered with tar-paper with tin trimmings, in longitudinal rows. It was thought at first that it was intended for a branch mint, as the skylight is put in like that in an assay office, but the ceiling is hardly high enough for that and the gables too pronounced. A nice row of such buildings would add materially to the aspect of the town and serve to carry out the idea of progressiveness now so popular. The beautiful glint of the tin ornaments in the sunshine makes it a thing of beauty, and no doubt it will be a joy forever."

Discussion of Some Details of Design and Construction of Sanitary Sewers

By W. T. KNOWLTON

THE question of how can we improve the condition of our sanitary sewers does not often arise in the ordinary affairs of every-day life.

To the general public a sewer is an underground feature which, being out of sight, is usually out of mind as well. When once laid, no more is thought of it, unless some noticeable odor arising from some unknown source is remarked. Then we are all prone to lay the cause for such odor to the sewer.

To go into a few details of sewer design and construction is the intention of the writer this evening, in order that possibly there may be features discussed which may prove of interest to the members of this Association.

At the start, it would be well to state that the sanitary sewers only have been considered in this paper, storm-drains and combined sewers being left for some future time.

The materials generally used for sanitary sewers are the salt glazed vitrified pipes. For sizes over 24 inches, vitrified pipe may be used, but brick or concrete should be considered. The question of obtaining a sewer that will not have defective joints is an important one. If water is encountered in the trench, tight joints and water-tight work is always deemed advisable. The entrance of ground water during construction is detrimental to the work in hand while leakage occurring after the sewer is built may cause trouble in several ways. On the other hand, owing to the inelasticity of a properly jointed line of pipe the foundation for the sewer must be a stable one. The use of a concrete foundation on sizes of 18-inch and under is being recommended by several today. Recently near Rochester, N. Y., continuous sewers of cement were built for the smaller sizes, thereby doing away with all joints. A core of steel was used in the process of building this sewer, the core being constantly drawn forward as the work progressed. With the exception of cement, the materials used in this new method of construction requires but short haul and ought to be cheaper than vitrified pipe.

Brick sewers are well adapted for the larger sizes of 36 inches and over, but here the question of cost enters. Labor is expensive when bricklayers demand from $6.00 and upward for 8 hours' work, and scarcity of masons may tend to delay the work. For many of our larger sewers, concrete either reinforced or not is proving cheaper today than brick.

The size of the ordinary pipe sewer for sanitary design has generally attracted more or less attention. It is advisable to lay not less than an 8-inch pipe as a rule. On steep slopes at the upper end of laterals 6-inch sewers may be built, if the grade exceeds 2 per cent. There are cities where 6-inch sewers are used extensively, but owing to the liability of getting the pipe blocked by sticks or other foreign substances, a 6-inch size is questionable except for house connections. House connection sewers may be of 5 or 6 inches diameter. One eastern factory of 2500 employees uses a 5-inch connection.

The depth to which sewers are laid is governed, of course, by the elevation of buildings to be sewered, and for the ordinary gravity system. This matter is studied best from the general plan of the system. Sewer grades depend more or less on the velocity of the flow. For inorganic material in sewers it is advisable to have a velocity of two and one-half feet per second, when flowing full, to carry the material onward; for sewers running less than half full the mean velocity will not be reached, however, and we must remember it will take a higher velocity to start a deposit moving than to keep it going.

On the other hand, deposits of organic matter in sewers are apt to be disintegrated by fermentation processes. Thus the larger solid matters are broken up. Later on, the formation of gases will tend to actually lift the deposit to the surface of the water so that it is readily carried along. Thus we see why the velocities of sewers running less than one-half full are sometimes sufficient to carry sewage on what would ordinarily be termed too flat a grade. As 75 per cent. of sewer systems often consist of 8-inch pipes, it might be interesting to look into some existing grades on sewers that have been in use for some years. The writer knows of some cities in the east where 8-inch sewers laid on a grade of .25 per cent. to .35 per cent. cause no trouble whatever. In one city a grade of .11 per cent. for an 8-inch pipe is in use. Owing to flat grades, the latter city is proposing to adopt .125 per cent. for a good many new 8-inch lines. In Cambridge, Mass., a 24-inch sewer laid 11 years ago on a grade of .06 per cent. has never caused any trouble, although the flow has been very slight at times. The writer was told that an 8-inch sewer in Michigan was built some years ago with a fall of but an inch in a hundred feet. The city of Manila is about to build their sanitary sewers. Here, owing to the fact that the surface averages but a few feet above tide-water, flat grades are necessary and a .4 per cent. grade is to be used. The writer has built 8-inch sewers on a .4 per cent. grade, but prefers .5 per cent. Velocities occurring from steep grades will have an effect on short lengths of flatter grades immediately following, and tend to carry along deposits that might otherwise occur.

In connection with the matter of sizes and grades comes the data to be decided upon for the quantity of sewage to be carried. The water consumption and future population must be estimated, and an allowance made for ground water leakage.

The writer has recently platted some diagrams for the flow in sewers on logarithmic cross-section paper to facilitate the design of sewers. The diagrams were carefully worked out from Kutter's formulæ and Flynn's tables, and are self-explanatory. Having a few prints of these on hand, they may be obtained from the writer.

Following the matter of grades, the use of flush tanks may be considered. If frequent flushing and some attention is given very flat grades have been found practicable. Among the examples noted above, an 8-inch sewer on a .2 per cent. grade is cleaned and flushed twice a year and gives satisfaction. The cost of cleaning for this sewer is about $5.00 per mile per year. Some few months ago the writer made a little investigation to ascertain the usefulness of the ordinary syphon flush tank. Replies to letters sent to several City Engineers where sanitary sewers have been in use for several years indicated that the automatic syphon is not held in favor. The experience of Worcester, Mass., would serve as a type for most of the places where letters were sent. The Superintendent of Sewers, Mr. Harrison P. Eddy, of Worcester, stated that after using different types of syphons for years, they have discarded the use entirely and are now filling the manholes at the summits by water from the city mains. The sewers are not flushed daily, but at intervals when found necessary, flushing some sewers which are very flat more often than others. This method is found to be much cheaper than with the automatic syphon.

One trouble with the Worcester flush tanks which is likewise found in Los Angeles, was the orifice through which the water was discharged into the tank. Where the amount of discharge is not over 300 gallons per day the stream enters the tank so slowly that bits of scale or dirt frequently close the orifice.

In other cities similar experiences are found. In one city on a visit to 116 tanks, over 40 per cent. were found to be stopped. As it generally proves necessary to have a maintenance department inspect the sewers regularly, the same men can flush the pipes by means of a fire hose attached to a hydrant when convenient, or by plugging the manhole outlet and let it fill to within a short distance of the top by use of a valve connected to the water service pipe which enters near the top of the manhole. The latter method is in use quite generally in eastern cities. A hose stream is, of course, much more effective than this filling of a manhole with water for flushing purposes. Cities in the middle west are somewhat divided as yet between the use of automatic syphons and hand flushing. The careful inspection and thoroughness needed to attend to this detail of sewer work ought to be under the charge of conscientious and reliable men. If not so, it may be advisable to have automatic syphons in use. For controlling the water which fills the flushing manhole, the manufacturers have recently placed a type of gate-valve on the market, and they are already in use with satisfactory results. By means of a counter-weight arrangement, very little energy is required to operate the gate.

To obtain a good sewer system some means of ventilation must be provided. The pipes and manhole chambers are liable to become filled at times with gases escaping from gas mains or other sources, so that unless an outlet is made for such gases, the gases may cause a nuisance whenever one is near the manholes. The presence in sewer manholes of illuminating and other gases is liable to cause an explosion, if in sufficient quantity or when ignited by electricity. Thus we see fatal accidents due to the blowing up of sewer manhole covers. To give good ventilation it has been customary to have the manhole covers perforated. This perforation may be carried too far, however, and too much area and opportunity provided for the inlet of water and dirt. The sewer may receive a large amount of water during storms so that it becomes a storm sewer, rather than a sanitary one. More detrimental, however, is the dirt which falls into the pan provided for catching it underneath the iron cover. The dirt soon fills the pan and becomes heaped up to the under side of the cover, so that the holes themselves fill with dirt. Where no pans are used the writer has seen discs of tin used to catch the dirt. In either case ventilation is stopped because there is from 3 to 6 inches of dirt underneath the manhole cover. It is better to reduce the number and size of openings in manhole covers, if ventilation is desired. It is the opinion of the writer that sewers can best be ventilated by the house sewers, using no trap between the street sewer and the soil stack which is carried above the roof of the house. This method of ventilation has been in use for some time past in eastern cities, and agrees with European practice. This subject was under discussion about 11 years ago in a Massachusetts city, where the writer was Assistant City Engineer. With very few exceptions, engineers at that time agreed upon the practice of ventilating the sewers through the roofs of the houses, and there is evidently no change in their opinion today. It may be best to use tight manhole covers entirely for very practical reasons. When the Street Department resurfaces the street or any excavation work is carried on, the manholes are apt to get covered entirely with dirt so that the perforations are filled with dirt. In some low places the air current has been found to go downward through the holes in the covers. It has been found by experience that the air in sewers has been as good with tight covers, as with perforated ones.

In connection with a properly designed and constructed separate sewer system, a few words may be said of cities where sewers are constructed in a desultory manner, regardless of a comprehensive plan. The cost of maintenance of gravity systems should be reduced to a minimum. Where defective joints and broken pipes occur, sand and other foreign substances are apt to enter and fill up the sewer. This trouble may come from the house connections as well as the street sewer.

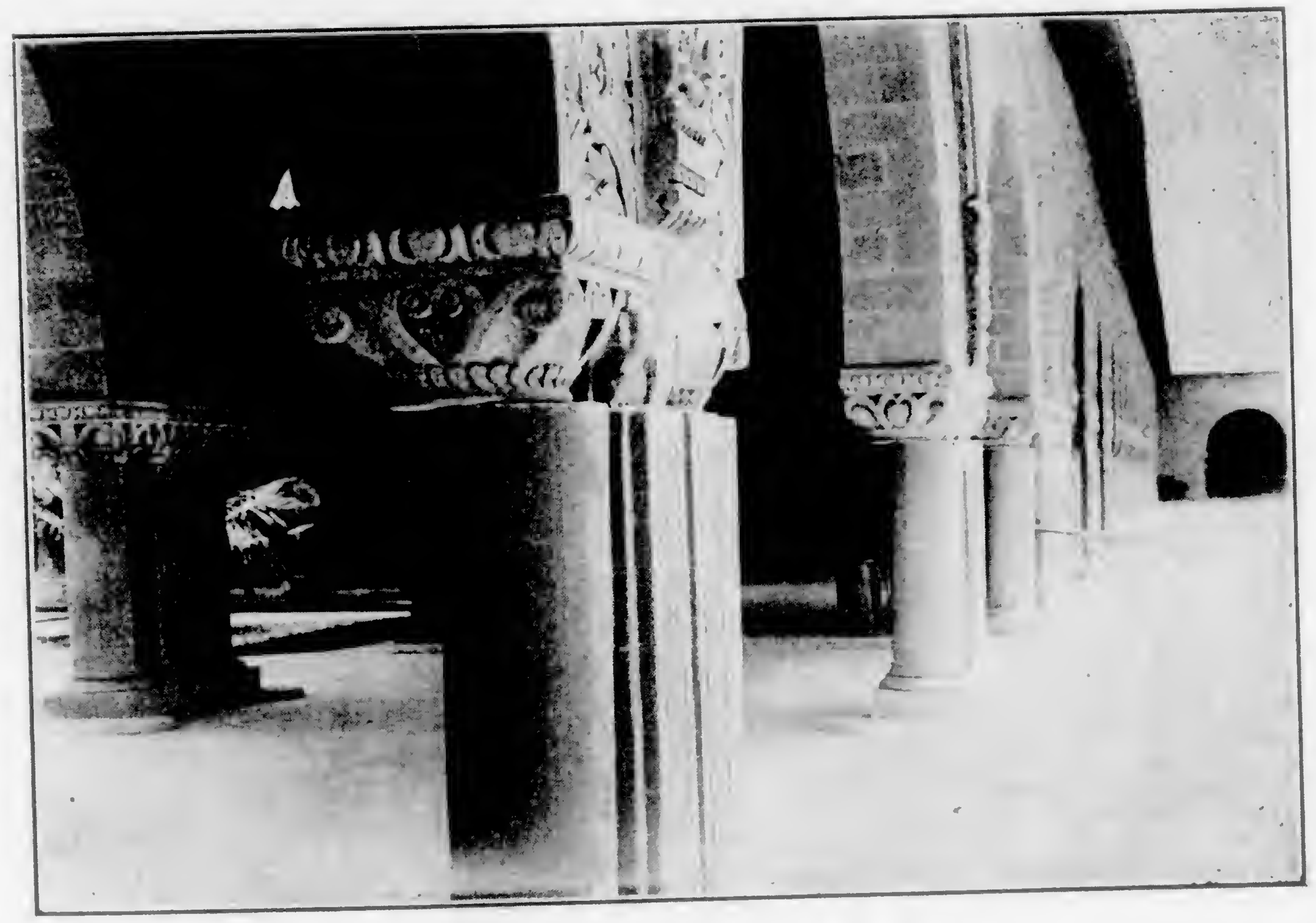
In some cities the design and construction of the house connections from the street sewer to the curb line is in the hands of the Engineer, and the writer believes that a better system is thereby maintained. Where such street improvements as paving, follows the sewer construction, it is a good plan to have the house connections built to the curb line in connection with the street sewer and previous to the paving work. As a rule, it is advisable to have one separate house connection for each building connected to the street sewer. Where the sewage of three, four or more large buildings enters the street sewer by a single 6-inch house connection, trouble is apt to follow sooner or later.

The matter of stoppages in constructed sewers is an important one. Besides sand,—rags, grease, sticks and other miscellaneous things may enter a sewer. To remove a stoppage caused by these things may be a costly matter, to say nothing of the inconvenience caused thereby. When sewers are built near trees, the roots of the trees may force their way through slight cracks at the joints so as to fill up a small pipe sewer. A concrete or water-proof covering may remedy this trouble.

Regarding breakage in constructed sewers, it is probable in many cases that such are due to the backfilling. When laid in trenches that require foundations, there should be great care exercised to secure good work. The specifications for this part of the work may be excellently worded, but sometimes impracticable. It is not easy to ram the material below and around the lower part of the pipe. The laborers do not appreciate the importance of such care, and the Inspector may be watching another portion of the construction. Suitable material for the backfill may not be at hand. If these points are not guarded against, the line of pipe will be liable to rupture at many places, should one pipe be broken. This is due to inelasticity of the joints as has been previously noted. To avoid ruptured pipe, fine sand or clean concrete may be used to fill up the springing line of the pipe. If the trench is backfilled before the joints have hardened, the sewer will adjust itself more or less to the settlement in the foundation. This reduces the liability to rupture, but increases the leakage if ground water exists in the soil. Where pipes are laid in gravel or rock cutting, room at the side of the pipe ought to be left for the proper compacting of the backfill. The pulling of sheathing is another cause of breaks in sewer pipes. The unequal pressure due to the releasing of the force, held in check by the sheathing, on one side of the sewer, has at times caused a lateral movement of the sewer. It is advisable to have four or five feet of earth over the pipe before starting the sheathing, and safer to leave it in place in many cases. Especially so is this the case when in fine running sand or quicksand. In dry trenches of which Los Angeles has many, the backfill can be replaced with ordinary care and secure good results.

It has been said that ground water at least doubles the cost of pipe sewers. The draining and pumping required for more or less time in advance as well as at the time of pipe laying, rapidly eats away the profits of the contractor. When designing the size of a sewer the allowance for ground water may at times be one-third of the total capacity of the sewer. It is almost impossible to obtain water-tight work in wet trenches. Some 6 or 7 years ago, in Honolulu, the writer recalls the effort made by the contractors to have no leaks in the main trunk sewer of the system. This was a concrete sewer and extended up line from its reservoir outlet for almost 2 miles below the level of the ocean. Being adjacent to the water and in coral rock formation, much water was encountered. As every gallon of water that flowed through the sewer had to be pumped, the contractors were to forfeit a sum of money for all ground water leakage above a certain amount. Thus it was for the interest of all concerned to reduce the leakage to a minimum.

One point to be considered in the use of pipe sewers in wet ground is the depth of bell of the pipe and the thickness of the pipe itself. Deep socket pipe is to be preferred to standard socket for sewers where much ground water exists, even if it requires more time and money to obtain the deep socket pipe. Double strength pipe may be used to advantage in deep cuts. The ordinary standard pipe may not be able to bear the weight of the soil at all times. If the soil is compressible, the custom of placing a heavy spoil bank alongside the line of trench may cause an overloading of the soil and a consequent breakage in the sewer pipes unless the pipe is of sufficient thickness. It is possible that some present this evening may not know that in England our double strength pipe is of the same thickness as their ordinary standard pipe. The bearing power of questionable soils may be ascertained previous to construction, and likewise the strength of the pipe to be used. To render economical work as well as effective work is the endeavor of the Engineer, but it is sometimes doubtful whether it pays to assume risks that are liable to cause breakages in the sewer pipes. Even though the inspection given may be with care, the responsibility for the construction is placed upon the Engineer.



Triple Gable Arch to Inner Quadrangle, Displacement Five Inches, Stanford University

The Uniform Design of Reinforced Concrete Position of the Architect

By LOUIS F. BRAYTON, C. E.

REINFORCED concrete, although the most popular form of fireproof construction at the present day, is a veritable chaos as to its design.

Quoting from a recent publication: "Many systems are patented and it is a common matter for designs to be furnished free, contingent on the designer's patent being used."

This seems to be an unnecessary state of affairs. Reinforced concrete should be standardized. Structural steel construction has been standardized until all mills roll the same sections. Standards devised by the various steel companies are practically uniform. There are no patents to speak of, and all designers uniformly adopt the standard sections rolled, and specify the uniform connections.

There is no reason why reinforced concrete should not be brought to the same state of uniformity.

It is true that there are at present a great variety of so-called "systems" which have more or less merit, but it is also true that perfect construction can be and is every day being devised, which is not patented forms or methods.

Standard methods should be adopted in such a form that the architect, engineer or contractor, is made entirely independent of the so-called patented "systems," and at the same time the standards should be arranged so that where it is shown profitable, a patented section could be substituted for the reinforcement shown upon the plans of the designer.

Until some systematic action is taken to standardize reinforced concrete, designers will be handicapped by the necessity of specifying some particular "system" or leaving the plans open to a free-for-all scrap as to who can do the work for the least money.

"What is the position of the architect to-day?" This question has been asked by nearly everyone in the profession. Is the architect to be the agent of the contractor, is he to be crowded out of the business by those who "design and build," or is he going to maintain his old time prestage, and stand firmly for his rights as to the character of construction which is to go into the building under his management?

These questions must be settled at once and for all, if the architect is to maintain his self respect and the confidence of his clients.

At the present time there are comparatively few architects who undertake to show upon their own plans the methods which must be followed in the construction of the reinforced concrete portions of the building under consideration. It is explained that the good methods are all patented and it would be wrong to show any one system. This is true only to the extent that no contractor should not be given a preference by the specifying of his system. "There are just as good fish in the sea as have ever been caught," and the architect should assert his independence by showing upon his plans what he knows to be a good form of construction, and free from patent royalties.

This may mean considerable study to some, but to those who prove themselves capable it will mean a restoration of prestige not now enjoyed by many.

Competition where cost is to be the deciding point, and design the battle ground, is, to say the least, "penny wise and pound foolish," if not actually amounting to criminal negligence.

Cement and Concrete

Hollow Blocks---Good and Bad.

By WM. B. GESTER, C. E.

UNDER the above heading, in the April number of this magazine, attention was called to the fact that the rapidly growing hollow cement block industry in California was threatened with injury, because of lack of knowledge and proper care on the part of some manufacturers in the State. The statement was made that untested cements were being used, that proper attention was not given to the selection of the inert aggregates, sand and gravel and stone, and that in many cases the quality of work given the assembling of the constituent parts of the blocks was sacrificed to an unwise determination to produce a too large quantity of blocks within a given time.

Inasmuch as the great fire of April 18th and the following days destroyed the greater portion of the April issue, which therefore failed to reach all of the readers of The Architect and Engineer, it may be well to again call attention to the facts as above stated. At the same time, an opportunity is given to produce evidence of the undoubted fact that well-constructed hollow-block walls will stand very severe earthquake shocks.

Mr. Octavius Morgan, of Los Angeles, in his very excellent article in the May number of this magazine, relates the fact that he saw at Palo Alto two hollow-block buildings that the earthquake had shaken to the ground, and he draws a conclusion which other facts, quite readily verified, will hardly help to substantiate. He concludes that in Palo Alto "it was demonstrated that hollow-block construction was no good."

This is just a bit sweeping. What really happened was that the Palo Alto occurrences demonstrated that SOME hollow-block construction was no good. Judging theoretically only, it seemed that Mr. Morgan's general condemnation could be hardly justified. It seemed as though a well-bonded wall of properly made concrete blocks ought to withstand a pretty good shaking; and now, as a matter of fact, as later returns come in, it is really demonstrated that although some hollow-block construction is no good, some other hollow-block construction is not only very excellent, but really wonderful in its ability to withstand an earthquake of the most violent description.

The ordinances of the City of San Francisco do not (more's the pity) make any provision for hollow concrete block construction, so that we can draw upon no examples from that city. The one district in the State, however, that suffered a still greater proportion of damage from the earth-crust disturbance of April 18th than the City of San Francisco was that of Santa Rosa, in Sonoma county.

Hollow Blocks in the Earthquake. Lee Bros. & Co's. Warehouse, Santa Rosa, After the Temblor

The daily papers have recorded the sad experiences of the "City of Roses," detailing the great loss of life and property by the earthquake, so that it is unnecessary to repeat the story, except to state that buildings of every description, large and small, frame and brick and stone, were utterly destroyed, shaken flat. There was a small silver lining to the very black cloud. It evidenced itself in the manner in which hollow-block construction withstood the visitation. The accompanying illustrations graphically tell the story.

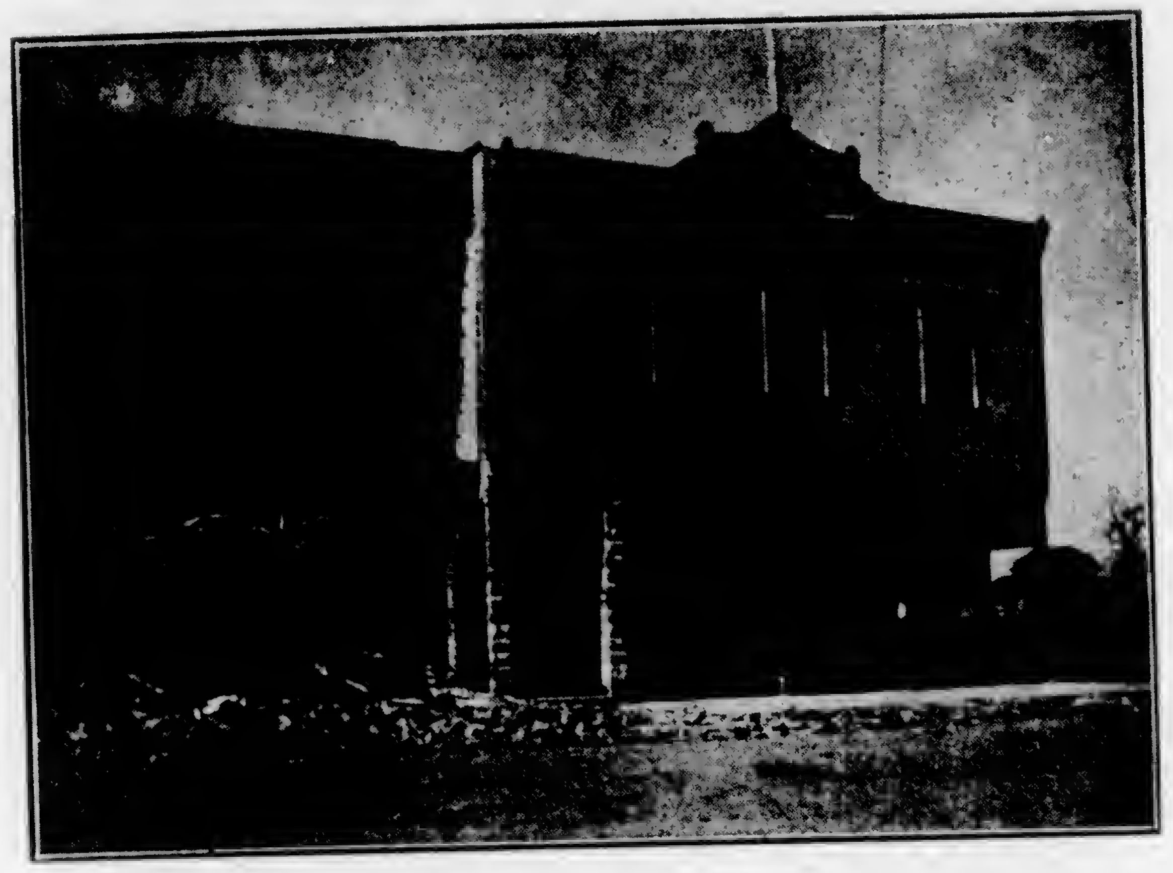
No. 1 is from a photograph, taken on April 20th, of the warehouse of Messrs. Lee Brothers & Co., Santa Rosa. The building represented is 66 feet wide and 145 feet deep, with walls 26 feet high, constructed of hollow concrete blocks, 12 inches thick. The corners at the top of the walls were slightly cracked, as barely shown in the illustration. A few dollars will repair the damage sustained. In the next block, the Santa Rosa Flour Mill and the adjoining warehouses, constructed of brick, were completely demolished. Directly acros the railroad right of way, a one-story bonded warehouse of brick construction was shaken to the ground.

Illustration No. 2 shows the relative effect of the earthquake upon two adjoining buildings in the town of Windsor, Sonoma county, the Masonic Hall, of brick construction, the front of which is entirely ruined, and the Odd Fellows' Building, 45 feet front by 108 feet deep, made of 10-inch hollow blocks by the Sonoma Stone & Construction Co., of Santa Rosa, which was so slightly injured that it was perfectly repaired at an expense of fifty dollars. The party wall between these two buildings, 108 feet long and 38 feet high, is of hollow concrete blocks, and it suffered by not so much as a single crack.

Mr. Samuel Purrington, of Mount Olivet, in the same district, had a hop kiln constructed last year of 12-inch hollow blocks. The building is 60 feet by 30 feet, and is 30 feet high. The earthquake was very severe at this point, but the hop kiln sustained no injury whatever.

The only hollow-block building in the town of Cloverdale, Sonoma county, is reported to have gone through the quake without hurt, while nearly every brick building in the town was damaged.

It is only fair to say that in every case mentioned in this list of hollow-block structures which successfully withstood the great earthquake, the blocks were intelligently made, with one part of sound Portland cement to four parts of clean, selected gravel. Also, that they were bonded in the walls with a good, honest mortar, containing a generous proportion of Portland cement.



Masonic Hall, (Brick) Odd Fellow's Hall, (Hollow Concrete Blocks)
The Fraternal Halls, Windsor, Sonoma Co., as they Appeared After the Earthquake

None of these Sonoma county buildings was over two stories in height, and it may be argued that their squat form saved them. Their form may have been of advantage, but brick buildings of similar height went all to pieces. Also, the contention as to form would certainly not hold in the case of the Wempe box factory, at the corner of Adeline and Fifth streets, in the city of Oakland. This is a four-story building, 54 feet high, constructed of hollow concrete blocks ranging from 14 inches to 9 inches thick, which withstood the shaking that Oakland got without injury, while in the immediate vicinity of the Wempe factory two brick buildings, one of them a new one, were completely demolished.

A really fair conclusion in the matter would therefore seem to be that it is the quality of the material and the quality of the construction work that have proven themselves the main general factors in the matter of resistance to earthquake shock, whether the material were hollow cement blocks or something else, and that well-bonded walls of properly made hollow blocks are not only proof against an extraordinarily violent earthquake, but that they are infinitely better than some brick walls whose builders would protest if it were intimated that they were not well and honestly constructed.

Uncle Joe Cannon took a rural constituent out to dine at an expensive hotel in Washington. Uncle Joe is exceedingly fond of green corn on the cob and made almost his entire dinner from that vegetable.

"See-ay, Mr. Cannon," drawled the constituent, eyeing the heap of bare cobs on the speaker's plate, "how much do you pay for board here?"

"Oh, about six dollars a day," replied the Congressman.

"Well," commented his friend, "durned if I don't think you could board cheaper at a livery stable!"

Goverment Ideas on Cement and Concrete

A BULLETIN of more than ordinary interest to builders is that recently issued by the Department of Agriculture on the mixing of cement and concrete. The bulletin is the result of a very careful examination of this subject by expert authority and, while it relates more specifically to the use of this material for farm purposes, the principles laid down are of equal interest and importance to all those who use concrete in any form. The following are portions of the report, containing its main features and recommendations:

The many letters received and referred to the Office of Public Roads with reference to the use of cement and the adaptability of concrete for various farm purposes have made it seem advisable to issue a short bulletin on the subject, in which a proper method of mixing concrete is described, together with a few of the many uses for which concrete is well adapted. No attempt has been made to give a technical discussion of the subject, the sole object being to treat in an elementary way those points in concrete construction which are of particular interest to the farmer.

In the appendix will be found the results of tests made to determine the strength of reinforced concrete fence-posts, together with tests showing the effect of retempering Portland cement mortar, and a diagram (fig. 14) illustrating the variation in strength of cement mortar produced by different proportions of clay in the sand.

Cement.—The term "hydraulic cement" is applied to one of the most useful materials of engineering construction and one which in recent years has become widely extended in its field of application. Hydraulic cement possesses the property of hardening, or setting, under water, in which respect it differs from lime, which does not harden except in the presence of air. Thus it is evident that in all places where air is excluded, such as foundations, thick walls, etc., cement mortar should be used instead of lime.

Only two classes of cement will be discussed here—Portland and natural. The difference between these is due partly to the method of manufacture and partly to the condition and relative proportions of the materials employed, which are, generally speaking, limestone and clay. In the manufacture of Portland cement the separate materials are mixed in such proportions as have been found by experience to give the best results. The mixing is done by grinding the materials together in mills, after which the mixture is burned at a very high temperature in kilns, and the resulting clinker ground to an impalpable powder is known as Portland cement. In the case of natural cement the materials used have been already mixed by nature in approximately the correct proportions, being found in the form of a rock which is generally classed as a clay limestone, or a limey deposit technically called calcareous clay. This material is burned at a much lower temperature than Portland cement. When the manufacturer has each ingredient absolutely under control and can adjust the proportions to suit all conditions, it is reasonable to expect that a beter and more uniform product will result than when the materials are found already mixed. Portland cement is far more extensively employed than natural cement on account of its superior strength, although the latter is frequently used in cases where great strength is of little importance. The superior strength and durability of cement as compared with lime, together with the low price at which it may now be procured, have caused the former to replace the latter in engineering construction to a great extent.

Cement Mortar.—Cement mortar is an intimate mixture of cement and sand mixed with sufficient water to produce a plastic mass. The amount of water will vary according to the proportion and condition of the sand, and had best be determined independently in each case. Sand is used both for the sake of economy and to avoid cracks due to shrinkage of cement in setting. Where great strength is required, there should be at least sufficient cement to fill the voids or air spaces in the sand, and a slight excess is preferable in order to compensate for any uneven distribution in the mixing. Common proportions for Portland cement mortar are 3 parts sand to 1 of cement, and for natural cement mortar, 2 parts sand to 1 of cement. Unless otherwise stated, materials for mortar or concrete are considered to be proportioned by volume, the cement being lightly shaken in the measure used.

A "lean" mortar is one having only a small proportion of cement, while a "rich" mixture is one with a large proportion of cement. "Neat" cement is pure cement, or that with no admixture of sand. The term "aggregate" is used to designate the coarse materials entering into concrete—usually gravel or crushed rock. The proportion in which the three elements enter into the mixture is usually expressed by three figures separated by dashes, as, for instance, 1—3—5, meaning 1 part cement, 3 parts sand, and 5 parts aggregate.

In the great majority of cases cement mortar is subjected only to compression, and for this reason it would seem natural, in testing it, to determine its compressive strength. The tensile strength of cement mortar, however, is usually determirned, and from this its resistance to compression may be assumed to be from eight to twelve times greater. A direct determination of the compressive strength is a les ssimple operation, for which reason the tensile test is in most cases accepted as indicating the strength of the cement.

Mixing.—In mixing cement mortar it is best to use a platform of convenient size or a shallow box. First, deposit the requisite amount of sand in a uniform layer, and on top of this spread the cement. These should be mixed dry with shovels or hoes, until the whole mass exhibits a uniform color. Next, form a crater of the dry mixture, and into this pour nearly the entire quantity of water required for the batch. Work the dry material from the outside toward the center, until all the water is taken up, then turn rapidly with shovels, adding water at the same time by sprinkling until the desired consistency is attained. It is frequently specified that the mortar shall be turned a certain number of times, but a better practice for securing a uniform mixture is to watch the operation and judge by the eye when the mixing has been carried far enough. In brick masonry the mistake is frequently made of mixing the mortar very wet and relying upon the bricks to absorb the excess of water. It is better, however, to wet the bricks thoroughly and use a stiff mortar.

Cement Mortar for Plastering.—In plastering with cement, a few precautions must be observed to insure good and permanent results. The surface to receive the plaster should be rough, perfectly clean, and well saturated with water. A mortar very rich in cement is rather a drawback than otherwise on account of shrinkage cracks, which frequently appear. The mortar, consisting of two or three parts sand to one of cement, should be mixed with as little water as possible and well worked, to produce plasticity. It is essential that the plaster be kept moist until it has thoroughly hardened.

Concrete.—Cement concrete is the product resulting from an intimate mixture of cement mortar with an aggregate of crushed stone, gravel, or similar material. The aggregate is crushed or screened to the proper size as determined from the character of the work. In foundation work, stone or gravel 3 inches in size may be used to advantage, whereas in the case of molded articles of small sectional area, such as fence-posts, hollow building blocks, etc., it is best to use only such material as will pass a one-half inch screen. An ideal concrete, from the standpoint of strength and economy, would be that in which all voids in the aggregate were completely filled with sand, and all voids in the sand completely filled with cement, without any excess. Under these conditions there would be a thoroughly compact mass and no waste of materials.

It is a simple matter to determine the voids in sand and also in the aggregate, but in mixing concrete the proportions vary a great deal, depending in each case upon the nature of the work and the strength desired. For example, in the construction of beams and floor panels, where maximum strength with minimum weight is desired, a rich concrete is used, whereas in massive foundation work, in which bulk or weight is the controlling factor, economy would point to a lean mixture. When good stone or gravel is used, the strength of the concrete depends upon the strength of the mortar employed in the mixing and the proportion of mortar to aggregate. For a given mortar the concrete will be strongest when only enough mortar is used to fill the voids in the aggregate, less strength being obtained by using either a greater or less proportion. In practice it is usual to add a slight excess of mortar over that required to fill the voids in the aggregate.

It is more accurate to measure cement by weight, unless the unit employed be the barrel or sack, because when taken from the original package and measured in bulk there is a chance of error due to the amount of shaking the cement receives. As it is less convenient, however, to weigh the cement, it is more common to measure it by volume, but for the reason stated this should be done with care.

Proportioning Materials.—For an accurate determination of the best and most economical proportions where maximum strength is required, it is well to proceed in the following way: First, proportion the cement and sand so that the cement paste will be 10 per cent in excess of the voids in sand; next, determine the voids in the aggregate and allow sufficient mortar to fill all voids, with an excess of 10 per cent.

To determine roughly the voids in gravel or crushed stone, prepare a water-tight box of convenient size and fill with the material to be tested; shake well and smooth off even with the top. Into this pour water until it rises flush with the surface. The volume of water added, divided by the volume of the box, measured in the same units, represents the proportion of voids. The proportion of voids in sand may be more accurately determined by subtracting the weight of a cubic foot of packed sand from 165, the weight of a cubic foot of quartz, and dividing the difference by 165.

For general use the following mixtures are recommended.

1 cement, 2 sand, 4 aggregate, for very strong and impervious work.

1 cement, 2½ sand, 5 aggregate, for ordinary work requiring moderate strength.

1 cement, 3 sand, 6 aggregate, for work where strength is of minor importance.

Coloring Cement Work.—In coloring cement work the best results are obtained by the use of mineral pigments. The coloring matter, in proportions depending upon the desired shade, should be thoroughly mixed with the dry cement before making the mortar. By preparing small specimens of the mortar and noting the color after drying, the proper proportions may be determined.

For gray or black, use lampblack.

For yellow or buff, use yellow ocher.

For brown, use umber.

For red, use venetian red.

For blue, use ultramarine.

Concrete Work in Freezing Weather.—Although it is advisable under ordinary circumstances to discontinue cement work in freezing weather, Portland cement may be used without serious difficulty by taking a few simple precautions. As little water as possible should be used in mixing, to hasten the setting of the cement. To prevent freezing, hot water is frequently used in mixing mortar or concrete, and with the same object in view salt is added in amounts depending upon the degree of cold. A common practice is to add 1 pound of salt to 18 gallons of water, with the addition of 1 ounce of salt for each degree below 32 degrees F. Either of the above methods will give good results, but it should be remembered that the addition of salt often produces efflorescence. It seems to be a fairly well-established fact that concrete deposited in freezing weather will ultimately develop full strength, showing no injury due to the low temperature.

Rubble Concrete.—In massive concrete work considerable economy may often be introduced by the use of large stones in the body of the work, but only in heavy foundations, retaining walls, and similar structures should this form of construction be permitted. In placing these large stones in the work the greatest care must be exercised to insure each being well bedded, and the concrete must be thoroughly tamped around them. Each stone should be at least 4 inches from its neighbor and an equal distance from the face of the work.

Concrete Basement Floors.—Basement floors in dwelling houses as a rule require only a moderate degree of strength, although in cases of very wet basements, where water pressure from beneath has to be resisted, greater strength is required than would otherwise be necessary. The subfoundation should be well drained, sometimes requiring the use of tile for carrying off the water. The rules given for constructing concrete sidewalks apply equally well to basement floors. The thickness of the concrete foundation is usually from 3 to 5 inches, according to strength desired, and for average work a 1—3—6 mixture is sufficiently rich. Expansion joints are frequently omitted, since the temperature variation is less than in outside work, but since this omission not infrequently gives rise to unsightly cracks, their use is recommended in all cases. It will usually be sufficient to divide a room of moderate size into equal sections, separated by one-half inch sand joints. The floor should be given a slight slope toward the center or one corner, with provision at the lowest point for carrying off any water that may accumulate.

Concrete Stable Floors and Driveways.—Concrete stable floors and driveways are constructed in the same general way as basement floors and sidewalks, but with a thicker foundation, on account of the greater strength required. The foundation may well be 6 inches thick, with a 1-inch wearing surface. An objection sometimes raised against concrete driveways is that they become slippery when wet; but this fault is in a great measure overcome by dividing the wearing surface into small squares about 4 inches on the side, by means of triangular grooves three-eights of an inch deep. This gives a very neat appearance and furnishes a good foothold for horses.

Concrete Steps.—Concrete may be advantageously used in the construction of steps, particularly in damp places, such as areaways and cellars of houses; and in the open, where the ground is terraced, concrete steps and walks can be made exceedingly attractive. Where the ground is firm it may be cut away as nearly as possible in the form of steps, with each step left 2 or 3 inches below its finished level. The steps are formed, beginning at the top, by depositing the concrete behind vertical boards so placed as to give the necessary thickness to the risers and projecting high enough to serve as a guide in leveling off the tread. Such steps may be reinforced where greater strength is desired or where there is danger of cracking, due to settlement of the ground.

Where the nature of the ground will not admit of its being cut away in the form of steps, the risers are molded between two vertical forms. The front one may be a smooth board, but the other should be a piece of thin sheet metal, which is more easily removed after the earth has been tamped in behind it. A simple method of reinforcing steps is to place a half-inch steel rod in each corner, and thread these with quarter-inch rods bent to the shape of the steps, as shown in fig. 6, the latter being placed about 2 feet apart. For this class of work a rich Portland cement concrete is recommended, with the use of stone or gravel under one-half inch in size. Steps may be given a half-inch wearing surface of cement mortar mixed in the proportion of 1 part cement to 2 parts sand. This system, as well as many others, is wel adapted for stairways in houses.

Reinforced Concrete Fence Posts.—There is a constantly increasing demand for some form of fence post which is not subject to decay. The life of wooden posts is very limited, and the scarcity of suitable timber in many localities has made it imperative to find a substitute. A fence post, to prove thoroughly satisfactory, must fulfill three conditions: (1) It must be obtainable at a reasonable cost; (2) it must possess sufficient strength to meet the demands of general farm use; (3) it must not be subject to decay and must be able to withstand successfully the effects of water, frost and fire. Although iron posts of various designs are frequently used for ornamental purposes, their adoption for general farm use is prohibited by their excessive cost. Then, too, iron posts exposed to the weather are subject to corrosion, to prevent which necessitates repainting from time to time, and this item will entail considerable expense in cases where a large number of posts are to be used.

At the present time the material which seems most nearly to meet these requirements is reinforced concrete. The idea of constructing fence posts of concrete reinforced with iron or steel is by no means a new one, but on the contrary such posts have been experimented with for years, and a great number of patents have been issued covering many of the possible forms of reinforcement. It is frequently stated that a reinforced concrete post can be made and put in the ground for the same price as a wooden post. Of course this will depend in any locality upon the relative value of wood and the various materials which go to make up the concrete post, but in the great majority of cases, wood will prove the cheaper material in regard to first cost. On the other hand, a concrete post will last indefinitely, its strength increasing with age, whereas the wooden post must be replaced at short intervals, probably making it more expensive in the long run.

In regard to strength, it must be borne in mind that it is not practicable to make concrete fence posts as strong as wooden posts of the same size; but since wooden posts, as a rule, are many times stronger than is necessary, this difference in strength should not condemn the use of reinforced concrete for this purpose. Moreover, strength in many cases is of little importance, the fence being used only as a dividing line, and in such cases small concrete posts provide ample strength and present a very uniform and neat appearance. In any case, to enable concrete posts to withstand the loads they are called upon to carry, sufficient strength may be secured by means of reinforcement, and where great strength is required this may be obtained by using a larger post with a greater proportion of metal and well braced, as is usual in such cases. In point of durability, concrete is unsurpassed by any material of construction. It offers a perfect protection to the metal reinforcement and is not itself affected by exposure, so that a post constructed of concrete reinforced with steel will last indefinitely and require no attention in the way of repairs.

Concrete Building Blocks.—Concrete building blocks, or cement blocks, as they are frequently called, are more extensively used now than ever before. These blocks are molded hollow primarily to reduce their cost, but this hollow construction serves other useful purposes at the same time. The fundamental principles governing ordinary concrete work, so far as proportioning and mixing materials is concerned, apply equally well to the manufacture of building blocks, and it should be borne in mind that strength and durability can not be attained by the use of any machine unless the cement, sand and aggregate are of good quality, properly proportioned, and well mixed. The aggregate for blocks of ordinary size should be crushed stone or gravel not larger than one-half inch. One of the chief causes of complaint against the concrete building block is its porosity, but this defect is in a great measure due to the fact that in an endeavor to economize, too little cement is frequently used. It is not unusual to give the blocks a facing of cement mortar consisting of about 2 parts sand to 1 of cement, while the body of the block is composed of a concrete of sufficient strength, though not impervious. This outside layer of mortar adds practically nothing to the strength of the block, and is used simply to give a uniform surface and to render the face of the wall more nearly impervious to water.

It would not be practicable, as a rule, to attempt the manufacture of concrete blocks without one of the many forms of molding machines designed for the purpose, nor would it be economical to purchase such a machine unless a sufficient number of blocks were required to justify such an outlay. Blocks in almost any desired shape and size, with either plain or ornamental faces, may be obtained on the market, and in the great majority of cases it is best to buy them from some reliable firm. Among the advantages claimed for hollow concrete block construction may be mentioned the following:

(1) Hollow-block construction introduces a saving of material over brick or stone masonry.

(2) The cost of laying concrete blocks is less than for brickwork. This is due to the fact that the blocks, being larger, require a much smaller number of joints and less mortar, and, being hollow, are of less weight than solid brickwork.

(3) A wall constructed of good concrete blocks is as strong or stronger than a brick wall of equal thickness.

(4) Concrete blocks, being easily molded to any desired form, will prove to be far more economical building material than stone, which has to be dressed to shape.

(5) Experience has proved concrete to be a most excellent fire-resisting material.

(6) Concrete blocks, being hollow, tend to prevent sudden changes of temperature within a house, making it cool in summer and easily heated in winter.

(7) The hollow spaces provide an easy means for running pipes and electric wires. These spaces may also be used wholly or in part for heating and ventilating flues.

How Hard Wall Plaster Stood the Test

By J. M. CURRY

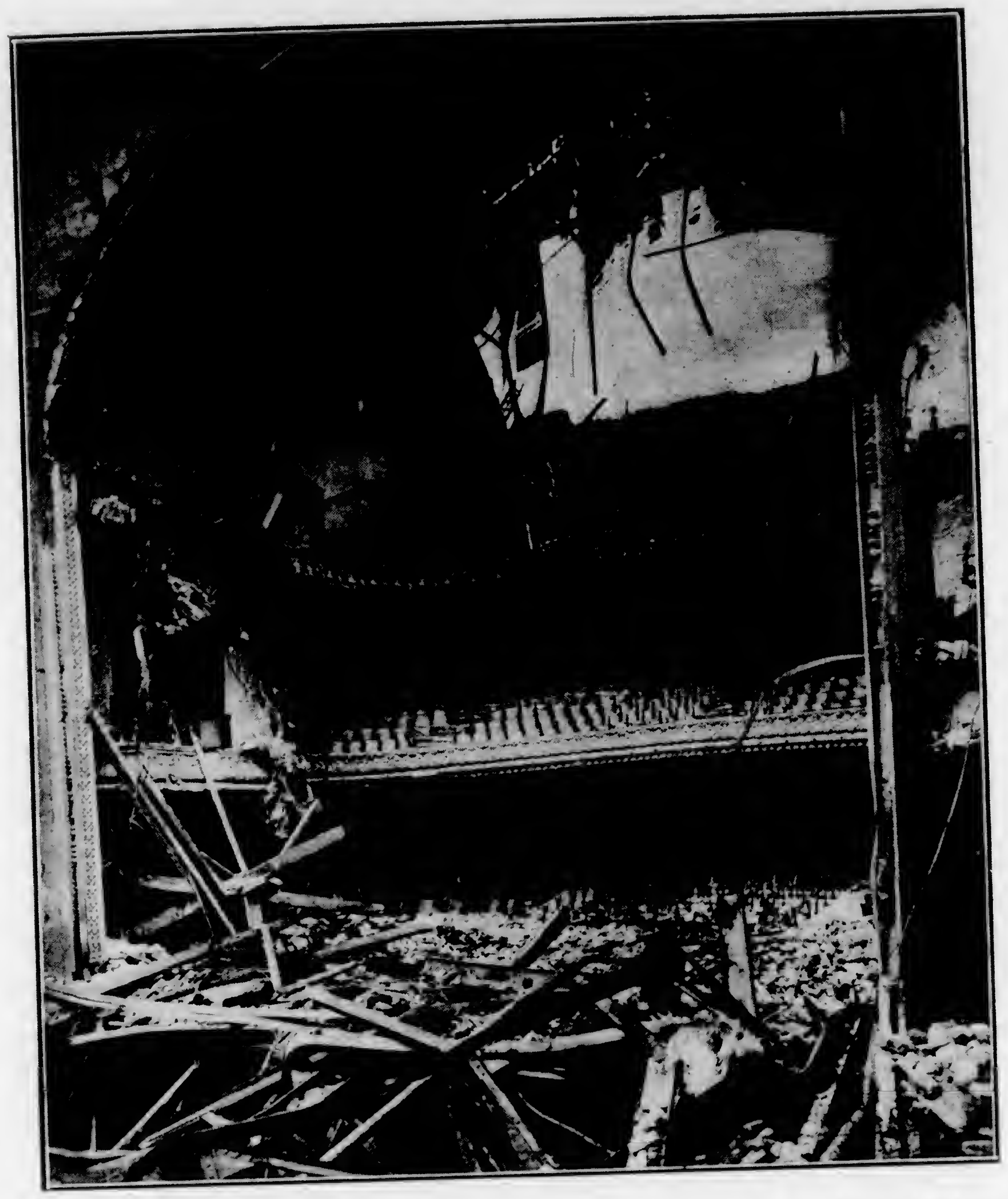
President and Manager of the Empire Plaster Company.

IN these rebuilding days when all building materials are being closely scrutinized and inquiries made as to how they stood the test of the quake and fire, those of us in the business who do not have to lie down and acknowledge that our material has not been a success and what we claimed for it, can at least have the satisfaction of saying, "I told you so." I have claimed that hard wall plasters, made from pure gypsum (sulphate of lime) are the only successful pastering materials. In my investigations since April 18th I have yet to find the first piece of it shaken from the walls where the buildings were not destroyed by fire, and not one job cracked enough to require repairing, while I have furnished at a low estimate at least five hundred tons of hard wall plaster in the past two months to repair broken plastering where the original plastering had been done with lime mortar.

I was especially pleased with the test of hard wall plaster in two buildings—one in Richmond, Contra Costa county, and the other on Rivola avenue, San Francisco, both being the homes of plastering contractors. The former is a six-room cottage plastered both outside and inside with hard wall plaster on wooden lath. The owner said he thought the house was being shaken to pieces, but after the temblor was over he could not find a crack in the plastering, while the other houses in the neighborhood plastered with lime mortar were totally wrecked. The house on Rivola avenue was plastered with lime mortar except the basement, which was done with a hard wall plaster. There was not a crack in the basement, while the plasterer had a fairly good-sized job repairing the remainder of the house.

In the burned district I found, except where the heat was so intense as to warp the metal or destroy the wooden lath, that the hard wall plaster had withstood the fire splendidly. When it was on brick walls it had to be removed with picks, while brick walls that had been plastered with lime mortar were left as clean as if they had never been plastered.

In the past few years some plaster manufacturers have attempted to cheapen their material by introducing a too bulky fiber or add too much sand, clay and other adulteration to make an easy spread, and some architects even specify plaster used in conjunction with lime mortar, which is another adulteration that is of no benefit, being quite as expensive and not nearly so good as pure plaster. Twenty-five years' experience with hard wall plaster has convinced me that commercially pure plaster of paris (calcined gypsum) properly retarded, mixed with the right proportion of clean, sharp sand, makes the ideal plastering material. It is moderate in cost, free from stain and an added strength to the wall in light construction. It has proved to be both earthquake and fire proof.



Interior View of the Majestic Theatre

Photo by Walters

Inexpensive Homes

Two wretched looking tramps were brought up before a justice of the peace. Addressing the worst looking one, the justice said:

"Where do you live?"

"I've got the room above him, your honor."

"And where do you live?" said the justice, addressing the other.

"Nowhere."

There are men who seem to think it is better to be well-heeled than whole-souled.

"Why don't you wear that lovely dress you've got upstairs, Mummy?"

"Oh, I keep that for when ladies and gentlemen come to dinner!"

"Couldn't we pretend father was a gentleman for once, 'cos then you could put it on tonight?"—Sketchy Bits.

Terra Cotta and Brick

Brick In San Francisco

ALL sorts of stories have been told about the stability of brick build- brick buildings were shaken down, while others stood, but this as- ings during the San Francisco earthquake. It has been said that sertion has been entirely unsupported by undisputed facts. What occurred before the fire broke out is at best but a misty memory to those who were present. And after the fire had run its course, so few buildings were left standing that it was impossible to say whether the earthquake or the fire was responsible for the wreck. Until there has been a fair test of brick buildings during an earthquake, unaccompanied by fire, it will be manifestly unwise to attempt to pass judgment upon the stability of brick structures or their power to withstand the tremors to which the earth is frequently subjected in some portions of the world. But, admitting for the moment the argument that brick buildings were shaken down, it can be said so were stone and wood structures, and it is perfectly safe to conclude from what has gone before that there will be no cessation in the use of stone or wood as a building material in consequence. If it is true that wood is shaken down by earthquake shocks, as it has been many times, why not cease building with wood in earthquake countries? It would be quite as reasonable to condemn wood as it would to condemn brick. One is no more likely to be destroyed by earthquake shocks than the other, yet there is a terrible hue and cry raised about the instability of brick, while wood is considered as safe as it ever was. Brick is quite as safe for tall buildings as stone. If properly placed about a steel frame, there is no reason why an earthquake shock should destroy it, unless it was sufficiently powerful to destroy wood or stone or any other building material at the same time. It is not against brick alone that the criticism of the construction engineers and architects should be directed, but against all materials which did not stand the shock, and that would include them all. The truth is that the brick walls, or the pieces of brick walls left standing after the fire, are quite as numerous as are the stone walls or the steel walls or the wood walls. The ruins contain quite as much brick as any other building material in quite as good state of preservation. There is absolutely no proof that the brick walls were not as stable as any other sort. There is no proof that brick walls succumbed before others, and there is no proof that brick isn't quite as safe for rebuilding as wood, stone or concrete.

What is needed in this controversy is a close adherence to facts and a disposition to give each variety of building material a fair chance with other varieties. Brick has withstood quite as great disasters as other building materials, and the ruins of San Francisco contain no proof to the contrary.—The Clay Worker.

Mr. Blinx's Bricks

How He Secured Material for the Only Brick Foundation Walls in Storkville Center

THE only man in Storkville Center who had a house with brick foundation walls," said Colonel Calliper, "was Robert Blinx. Not but what bricks are to be had in plenty in that locality, for there is a fine pit of brick clay in the neighborhood, but stone is cheaper still in that rock-ribbed region, and the universal custom there was to carry the cellar walls up to the first floor of the same material.

"And so, when Robert Blinx built him this house with above-ground foundation walls of brick, why, naturally, those brick supporting walls were considered remarkable, but the walls themselves were not nearly so remarkable as the manner in which the brick contained in them were obtained, with the incidental fact that Mr. Blinx got his bricks for nothing.

"Mr. Blinx, as it happened, lived a little out from the center, on a road to the brick kilns, and right back of his place, on another parallel road, there was a row of cottages, occupied by men who worked in the brickyard.

"Now, Blinx had cats, and it was not long after he came there before his cats became a great annoyance to his brickmaker neighbors in the rear. The cats would come out into Blinx's back yard and garden of nights and howl and yowl frightfully and disturb the brick men's sleep.

"Pretty soon, as people do everywhere at other people's cats, the brickmakers began throwing things at Blinx's—bootjacks and old shoes and the usual things like that—with the usual ineffective results, until finally one night, just by the merest chance, one of the men picked up and threw at the worst of the cats a brick, which landed fair and square on its mark, with results most gratifying to the brickmakers.

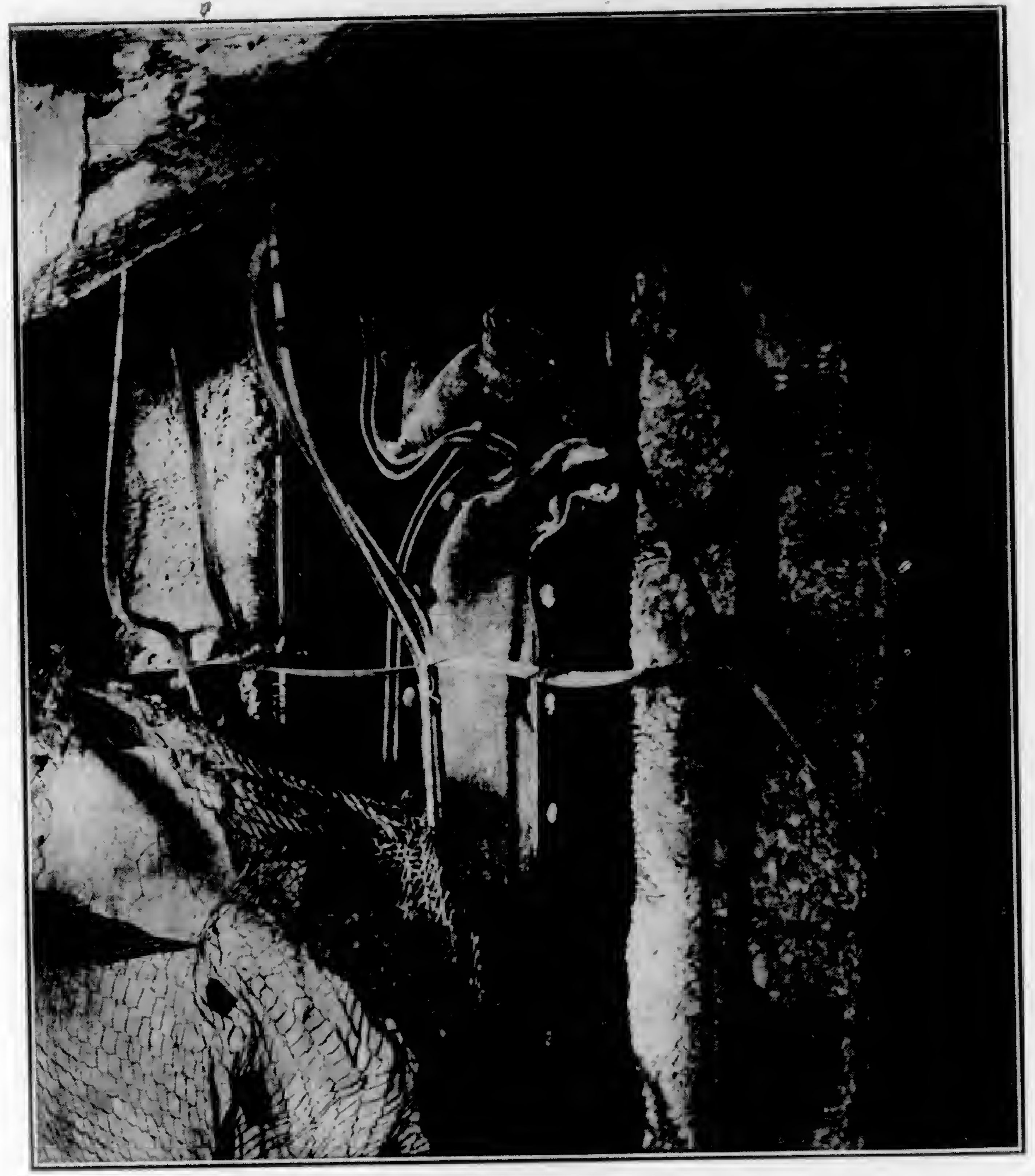
"After that they threw many bricks, which rarely hit what they were aimed at, but which did tear up Mr. Blinx's back yard and garden something scandalous. And then the throwing of the bricks suggested to Mr. Blinx an idea.

"Mr. Blinx came to think about building a new house. And he was a thrifty man, always saving where he could, and when those bricks began to come over he had an idea. Blinx set about collecting the bricks thrown at his cats, the mason having told him that if he built of that material his top foundation walls would require about 4,000 bricks.

"There was just a post and rail fence running along the rear of Mr. Blinx's property, between that and the brick men's yards, and now he put up, at the foot of his yard and garden plot, a six-foot board fence, setting it back about six feet, so that when the bricks struck it they would fall on his own land.

"All cats, everywhere, like to walk on the tops of fences, and all cats seem to welcome meeting other cats there as an amply sufficient provocation for clawing and spitting, fighting and howling; and no sooner had Mr. Blinx got his fence up than all the cats in Storkville Center, apparently, came nights to walk on it, and what had seemed the frightful howling of Blinx's cats seemed now to the sounds produced by this new great band of cats as but the feeble tuning up of a few scattering members of an orchestra to the gale that breaks loose when the whole outfit gets going.

"The brick men were stirred accordingly, and night after night, when they came home from work, they brought valises and carpet bags full of bricks, and when the cats started up they did. With the first squeak of



Showing a Buckled Column in the Fairmount Hotel

a cat you'd hear a brick land against the board fence, and when the cats got going—why, humph!

"I've heard what some persons thought was quite some racket in back yards here in the city when cats were caterwauling, but all that would be child's play to what you could hear out in this quiet country place when the bricks were thundering on Blinx's board fence and forty cats on top of it were wailing and screeching and screaming above the uproar.

"All this was music to Blinx. Why, he told me that on a number of mornings he carried away five wheelbarrow loads of bricks, and one morning he got seven. And in less than a month he had bricks enough for what he wanted, and to spare.

"Then he tore down the fence and drove away all the cats, his own included, and gave the neighborhood peace, and gave the mason orders to go ahead with the cellar foundation, and he had bricks enough left for the walls and pretty near enough left for his chimneys.

"Blinx is dead now, but the old house still stands, the first and only house with top cellar walls of brick ever built in Storkville Center."—New York Sun.

More First-Class Designs and Good Steel Construction Wanted

By W. W. BREITE, C. E.

WHILE a vast amount of literature has appeared on the subject of the seismic disturbances and consequent conflagration which visited the city of San Francisco several months since, much has been written of them that upon examination and investigation has not only been found to be misleading but untruthful as well.

The inability to make a comparison with some previous event of a like nature and equally as disastrous, has had a tendency to make many exaggerate, and the fear to be outdone by others has led some, under the stress of excitement at the moment, and while the city was still in a chaotic condition, to express views which now are seen to be absurd.

None will deny that the primary cause of the catastrophe was the earthquake, but to say that the responsibility for the destruction was mainly due to this, is not true.

A conservative estimate of the loss due to the quake made by a board of experts competent to judge, has been placed at about three-quarters of one per cent of the loss due to the fire immediately following, and the statement has well been made that, were it not for the fire, business would have quickly assumed its normal aspect, and the "shake" would have been a thing of the past, long ago.

Directly after the calamity there sprung up in our midst a multitude of experts, each and every one of whom rushed into print with his views and reasons, deducted in many cases from a very casual, superficial examination and in many other cases from no examination whatsoever.

Honest, competent criticism, together with common-sense discussion, should be encouraged, but derision and ridicule should meet the views and opinions of many of these so-called experts.

Thus we are told that "heavy stone ornamentation should not be hung to steel frames," and, again, that "heavy stone ornamentation should be securely tied to steel frames"; that "wooden joists should be securely anchored to tie the brickwork," and, again, that "wooden joists should not be anchored so that they wil not pull down the brickwork when the burn and drop away"; that "nothing is absolutely safe but steel-cage construction," and, again, that "brick construction is as safe as steel cage."

The steel expert tells us that steel is the only thing, the concrete expert likewise insists on concrete, the terra cotta man on terra cotta, the brick man advocates brick, and the lumber man has just as strong and convincing an argument on the superiority of frame buildings.

In fact, the mass of opinions and evidence along all lines is just as convincing, apparently, for, as well as against, any particular method and kind of construction.

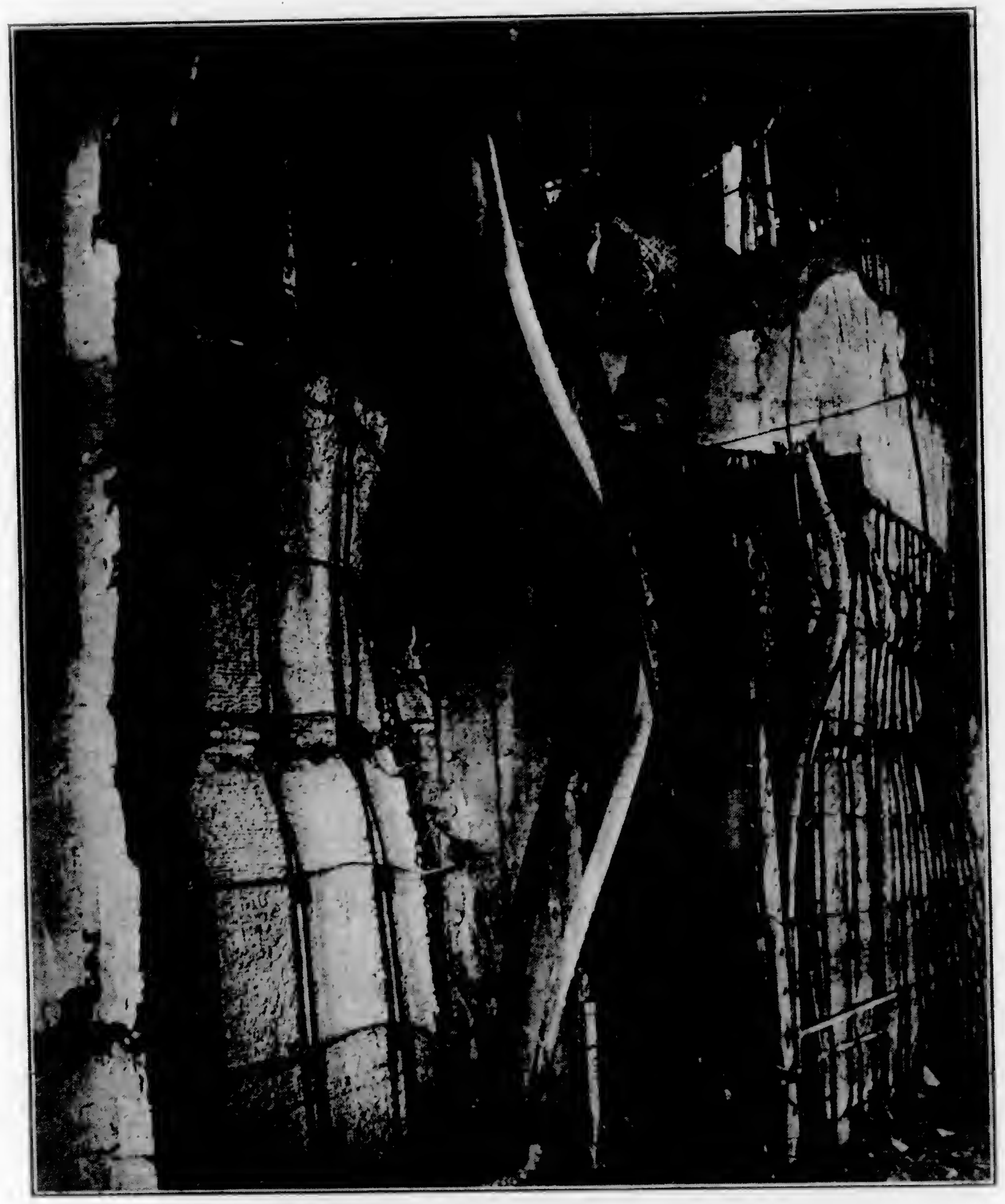
Each and every form of construction has its particular adaptability for certain kinds of buildings, but to insist that all buildings, irrespective of their uses, should be of steel, or of concrete, or of brick, or of any one particular form or kind, is certainly absurd.

Many suggestions have been made as to the building of earthquake proof and fire proof buildings, but it is the consensus of opinion that in the main there seems to be no need of changing the present methods. That there are many ways in which many of major and minor details of construction can be improved upon is an admitted fact, but these are mere matters of details, and hardly need a calamity such as we have had to bring them to the notice of any person of sound judgment.

The pith and point of the many lessons to be derived from the recent catastrophe resolves itself into the question of good design and competent, honest workmanship and quality of material.

We need no earthquake or fire to illustrate the fact that half an inch of plaster will not fire proof, that bracket connections are inferior to gusset plates and knees, that lime mortar is not as good as cement, that poor workmanship is dear at any price, or, in summarizing, that poor design, detail and cheap construction is inferior to first-class design and first-class construction.

Let us heed well the lessons we have learned, and in future build as we should build, with nothing but the best materials, workmanship, brain and brawn, and honest, conscientious endeavor, and we may rest assured that our city will never again be visited with a calamity such as she has recently experienced.



Buckled Columns in the Hotel Hamilton

View on the Second Floor of the Fairmount Hotel

Effects of the Heat on the Fire-proof Tiling in the Union Trust Building

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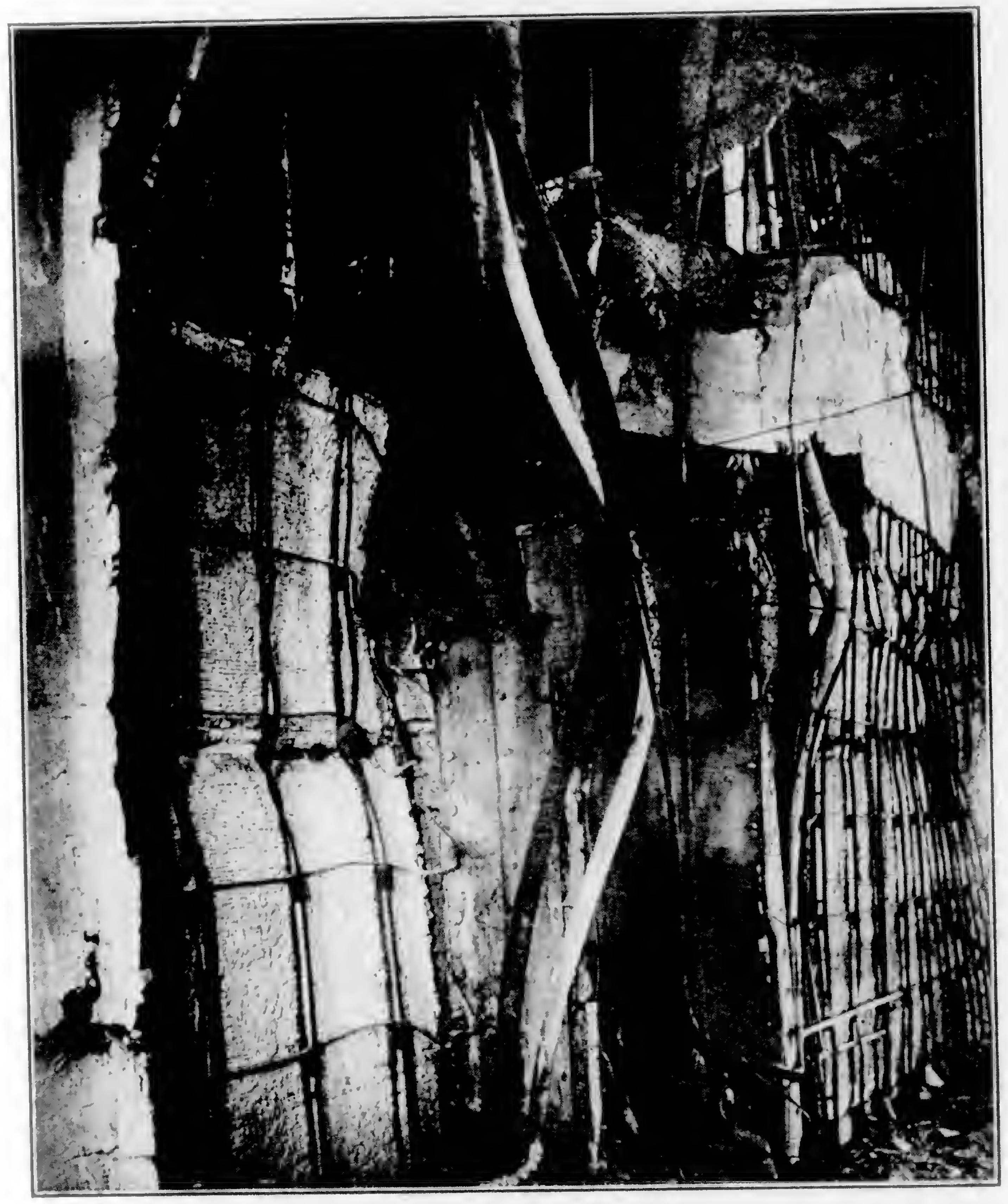

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Interior Decoration

Wall Papers of Olden Times

By C. WALTER TOZER

THERE is a great deal being written now of old-time wall papers, due to the recent revival of the colonial decoration and furnishing which is now so much in vogue. The fad of collecting antique American furniture has naturally evolved an interest in wall papers of colonial pattern, and such antique wall papers are exceedingly rare today, owing to their perishable character. Although there are not a great many of these old wall papers in existence, still there are some to be found in New England, New York, Virginia and Georgia. There are indeed but a few houses in which these old papers have survived the workings of time and fortune. For the most part they have gone the way of perishable things. The few that exist in the Eastern States are fast disappearing, and just as they are going, the attention of the twentieth century decorator is turning to them again for a novelty, and some few of the old scenic papers are today being reproduced or imitated.

The artist and illustrator of the past have represented colonial interiors painted or with whitewashed walls, while as a matter of fact, when investigated thoroughly, they should show panoramic views, scenes from mythology and literature, landscapes with people, animals and birds —the architectural masterpieces of the Old World and the New.

Mr. R. J. Waring, the prominent English decorator, who was in New York early in April, said the colonial was our best style. He also said the colonial style could easily be developed from where it had been dropped, if clever workmen were instructed in the principles of style and were allowed to bend all their energies to its improvement.

The real antiques have now suddenly become very valuable, and their possession is becoming a source of great pride, especially in New England. Only back to 1880 it was said: "One can hardly estimate the courage it would take to own that one liked an old-fashioned paper." And now, in 1906, all the best manufacturers of wall papers are reproducing the very old designs, for which they find a ready sale among the most fastidious searcher for the beautiful. One wall paper importer says: "Yes, old-time wall papers are being revived, and no concern is taking more interest in the matter than ourselves. Among old designs which have not been printed for thirty or forty years, some have been taken up and done in colors to suit the tastes of the period, and we find that few of the new drawings excel, or even approach, the old ones in interest."

Wall paper was not manufactured in this country to any extent until as late as 1830. Most of the papers even then were imported. Those

which remain to us from Revolutionary days nearly all came from France. In the New England States the papers were chiefly scenic in type, while in the South they were of purely ornamental pattern, of the Louis XV. type. A fine landscape paper is still to be seen in Andrew Jackson's old home in Tennessee.

In those days, however, the printing of wall paper was an entirely different matter. All the wall paper printing was by hand with square, flat blocks, while today circular blocks turn out repeated patterns by the mile. Now one machine can hold a dozen blocks or more, each carrying a different color, while it took dozens of these blocks, formerly, to print one of the patterns which extend for several feet each way without a repeat, particularly where several colors were used.

Hand printing requires great patience and precision, but machine printing is merely a matter of careful attention to the machine. During the early commercial prosperity of some of the New England towns, their ships brought from foreign lands rolls of rare wall paper. Some of these decorated the homes while others reposed in some out-of-the-way place. There was really little thought given to the value of these artistic designs, and they were so carelessly treated that today they show plainly, on their surface, the ravages of time. Others, more tenderly cherished, are as fresh in their coloring as when first placed on the walls.

One paper found in an old Massachusetts home had the beauties of the Bay of Naples, with Mount Vesuvius in lively eruption, depicted on the walls.

Another, in an old Salem home, represented scenes from the life of Don Quixote. The paper is brown in coloring, with a background of white, and the panels depict phases of his journey, the first showing the eccentric knight taking his oath of allegiance before starting out on his career. Each panel is a story in itself.

Venetian scenes are also found in a number of these old papers. One has a background of red on which are thrown Venetian scenes in brown and white. Another is gray in coloring and represents scenes in Venetian life.

A group of peculiar wall coverings is described in a recent book by Kate Sanborn, entitled "Old Time Wall Papers." This, because of its intense interest, we will quote:

"In the year 1793 General Knox sent a party of workmen from Boston to build a summer residence on the banks of the Georges River. The mansion was to be much a French chateau, and was often so designated by visitors. It had several rooms which have long been an object of interest to those who visited the old house in recent years. The front entrance faced the river. The first story was of brick, containing the servants' hall, etc. The second floor had nine rooms, the principal of which was the oval room, into which the main entrance opened. There were two large windows on either side of the door, and on opposite sides were two immense fireplaces. This room was used as a picture gallery and contained many ancient portraits. It also had a remarkable clock. It was high, and the case was of solid mahogany. The top rose in three points, and each point had a bras bal at the top. The face, instead of the usual Roman numbers, had in Arabic, 1, 2, 3, etc. On the two small dials on each side of the case were little windows showing machinery. Beside the two windows, on one side of the room, was a magnificent mahogany bookcase, twelve feet long and elaborately trimmed with solid silver, which had belonged to Louis XIV.

"One room in the building was called the 'Gold Room,' and everything in it, even the counterpanes, was of gold color. The walls were covered with yellow paper—yellow as buttercups. Another room was papered with a magnificent pictorial paper, which had a background of sky blue, on which were a wreath, with torches, censers, with flowers above, and two loving birds, one on the nest and the mate proudly guarding—all in light brown and gray, with some sparkling mineral, or the tiniest particles of glass, apparently sprinkled over it, which produces a fascinating glitter and raised appliqué effect. This room was used as a dining-room.

Still another room was papered with scenic paper, representing the seaport town of Gallipoli, of European Turkey; armed men are marching, and you can see the water and picturesque harbor, and Turkish soldiers in boats. The red of the uniform brightens the picture, with a background of gray, and the views are enclosed in harmonious grounds, suggesting trees and rocks. The paper came in small pieces, before rolls were made."

In her interesting book the author also tells of the death room in certain New England residences. These depressing rooms had but one window. The paper was dark and gloomy—white, with black figures, and a deep mourning frieze. Benches were arranged stiffly around the sides, and there were drawers filled with the necessities for preparing a body for burial; linen and a bottle of camphor were never forgotten.

There are a number of these old papers we could describe, but for want of space we will let these descriptions suffice.

We are indeed fortunate that before the destruction of all these wall papers the fashion had turned backwards and with the revival of the love for antiques many which would have been destroyed have been carefully treasured.

Not only should these old wall papers be sought for and their preservation encouraged, but they are worthy of study by all who are interested in the revival of the colonial style. The true colonial room in the American home should be decorated with a paper of this type—possibly over a white wooden wainscoting.

The old papers were designed for old conditions. They were placed on old walls in old houses; the furnishings of these apartments were, in most cases, contemporaneous with the old-time papers.

Modern houses represent conditions wholly new and modern. Objects of beauty are always beautiful wherever placed and wherever kept; but old furniture, old pictures, old ornaments only yield their fullest value of beauty and significance in an environment that recalls their original habitat.

Old wall papers go as badly with new furniture and new rooms as can be imagined. Old wall paper calls for old furnishings much more loudly than the furnishings demand the old paper. But a room harmoniously furnished throughout with old paper, old furniture, old-time rugs on the floor, curtains of old-time patterns at the windows and openings, will have a charm and beauty hard to equal.

Fashions in Wall Coverings

THE season brings around its fresh suggestions in the matter of wall coverings. Changes in wall coverings have more substantial reason behind them than most changes dictated by fashion. Modern wall coverings are not permanent. Paper, which is the most popular material, has little sanitary value. It readily absorbs dirt, loses its color, and in many ways ceases to be both useful and agreeable at the same time. Other materials are hardly more sanitary, and hence the need for frequent change in the wall covering is very apparent in most houses. In the majority of cases, in fact, it is changed less frequently than it should be, a circumstance due, perhaps not so much to cost as to the inconvenience entailed.

Fashions in wall coverings, therefore, represent not only an advance and improvement proposed by the vendors of such wares, but correspond to an urgent household necessity. The chief thing to be considered in changes of this kind is not the obtaining of the newest fashion, but betterment. A satisfactory wall covering is often permitted to outlive its usefulness, because it is pleasant and agreeable; in a word, because it is satisfactory, and no idea occurs to the houseowner as to how to improve it. The simplest remedy in such cases is the best—to renew it. If that be impossible, for papers and fabrics popular at one time cannot always be duplicated several years later, make the new covering as close to the old as possible.

There are few more irksome tasks in household equipment, says American Homes and Gardens, than the selection of the wall covering. It is a matter that tries the patience of the purchaser and calls for the utmost tact on the part of the salesman. It is always safest to consult a trained decorator, and when several rooms are to be done over proceed on a related scheme. The trained decorator may not always give complete satisfaction, he may not always be the cheapest possible agent to employ, but his increased cost, if any, is more than likely to be conpensated for in the superior quality of his work; and the occasions when he fails are certainly bound to be fewer than when the untrained housekeeper sets forth to recover her house without any idea of what to do or how to do it.

Changes in wall coverings can seldom be made too frequently. They can never be made without inconvenience; without more inconvenience than, for example, would attend a complete change in furniture. But with the first indication of wear a change should be made. The latest fashions may, then, be followed with advantage. Often enough there is nothing else to be done, and the improvement in taste, both among the manufacturers and the decorators, is so pronounced that the new work is likely to have charm that the older did not have.

Where Advertising is Valuable

Perhaps there is no more difficult problem in the world of business than to arrive at a fair judgment of the advertising value of space in a newspaper. In the nature of things this value cannot be definitely measured, as are yards of cloth or bushels of wheat or pounds of coal. It is as intangible as is the something that lifts a great picture above the level of a mere painting. The canvas of each may be alike, the colors from the same tubes laid on by the same brushes, yet the result may have a market value of $100,000 a square foot as a Meissonier or $5 a square yard as hack work.

Circulation is often the only claim to an advertiser's attention that a newspaper presents. But circulation alone is far from being the all in all. There must be circulation or there can be no advertising value. The more circulation there is the better for the advertiser—if the right people are reached by it in the right way. And there the problem appears. Who reads the newspaper is vastly more important to the advertiser in its columns than how many read it.—*N. Y. Herald.*

Among the Architects

The New Building Ordinances.

The Supervisors have adopted the new building ordinances which are fairly satisfactory.

In regulating the use of concrete, the ordinance provides that all reinforced concrete walls shall be at least six inches thick; that if the area of wall surface included between two adjacent columns and adjacent floor girders is between three hundred and four hundred square feet, the thickness of the wall shall be at least eight inches; that if such area exceeds four hundred square feet the thickness shall not be less than twelve inches, the walls being supported on steel frames at each story, and that if the concrete be not reinforced all walls shall be at least twelve inches thick. The ordinance also provides that in reinforced concrete walls the area of steel reinforcement shall be at least one per cent of the area of the concrete, one-half to be placed vertically and one-half to be placed horizontally, and that no reinforcement shall be spaced more than twelve inches apart. Additional reinforcement is to be placed around all openings, all reinforcement is to be wired at each intersection, and to be rigidly connected at columns and girders to the steel frame.

As regards brick, the ordinance provides that brick walls shall be at least eight inches thick; that brick shall be laid either in cement-lime or cement-mortar; that all brick except on the face shall be completely surrounded with mortar; that every sixth course shall be a heading course, and that all brick walls shall have a supporting part of the steel frame, which shall extend to within two inches of the face of the wall.

The ordinance provides that the height of sky-scrapers, Class A, steel-brick buildings will be limited to one and one-half times the width of the street on which they may be located.

Class B, fireproof buildings 102 feet; Class C building, with metal lath, 70 feet, and with wooden lath, 55 feet; frame building, 45 feet.

Class A and Class B buildings are to be built of incombustible materials, and allowed in any part of the city. Class A buildings are to have steel frames carrying all wall and floor loads.

Class B buildings are to be built either with steel or reinforced concrete walls supporting a part of the floor loads, or with walls self-supporting only, the floor being carried on the steel frame; all floors to be fireproof, and except the frame to be equal in all respects to Class A.

Class C buildings are to be built with brick or concrete walls and timber interior; to be in effect the same as class B. Class C buildings of this sort will be allowed in all parts of the city.

San Francisco Architectural Club.

The regular monthly business meeting of the S. F. A. C. was held in the new clubrooms at 1017 Steiner Street, July 11th, and a large number of members attended.

All of the officers were in their respective places and business was transacted as before the earthquake. The members seemed to be in good spirits and looked prosperous. About ten applicants for membership in the club were elected members, the majority being Eastern men who have come here since the disaster.

The classes in steel construction and design were reported as having good attendance. Mr. Chas. F. Archer advised those members who wished to join the steel class to do so at once or they would miss the preliminary work.

Before the meeting adjourned the house committee was requested to arrange for a banquet to be given in September.

Honor for Young Architect.

Mr. G. Albert Lansburgh, a Californian, who has just returned to California with the intention of making his home here, was awarded at this year's salon in Paris, a gold medal for architectural composition which he exhibited. News of the award was cabled to this city. The young architect received his early education in the public schools of San Francisco and at the University of California. He went abroad seven years ago, spent a year in travel, and devoted six years to study in Paris. He is a graduate of the Ecole Nationale des Beaux Arts at Paris, received his Government diploma as architect last year, was awarded several medals in the regular competition in the School of Fine Arts at Paris, and made an excellent record while at that school.

The Luning Building of Concrete.

The fifteen story Luning building, which forms the frontispiece in this issue of the Architect and Engineer, is to be built of reinforced concrete. The structure is to be built by Geo. S. Fife from plans by Architect Edward J. Vogel, at the intersection of Market, Drumm and California streets. It will be a handsome and stately building, and will cost $400,000. The entire exterior will be constructed of the best reinforced concrete and finished in handsome colors. The dome and main cornice will be of dull copper. The main entrance will be composed of steel, and equally fireproof material, while the main vestibule will be of polished marble.

Brick from the Ruins.

An important feature in the rebuilding of San Francisco will be the disposition to be made of the many million of fallen bricks from the ruins. Many of the best are being used after cleaning, a number of machines designed for that purpose having been brought here. The structural engineers' organization has taken up the subject of investigating the feasibility of utilizing brick bats in making concrete for building purposes. Several instances of their successful use in the vicinity of San Francisco are on record. The effects of the earthquake have demonstrated that concrete containing broken brick has stood as well as almost any other concrete.

The large four-story factory of the Pacific Coast Borax Company, on the marshes of Alameda, was constructed of concrete which contained a large quantity of broken brick taken from one of the pioneer buildings of San Francisco. The foundations of Gladding, McBean & Co.'s large terra cotta and pottery works, near San Francisco Bay, were made of concrete containing refuse from the terra cotta and brick plants. Both of these structures were uninjured by the earthquake.

Hearst Wanted to Erect Twenty-Six Story Sky-Scraper.

Another instance of the deplorable results of the new building ordinance limiting the height of a building in the business section of the city to one and one-half the width of the street, is had in the case of William R. Hearst, of the Examiner. Mr. Hearst had plans completed by the well known firm of Eastern architects, Kirby, Petit & Green for a magnificient twenty-six story office and newspaper building to occupy the site of the burned Examiner building at Market and Kearney streets. The plans are now being altered for a 12-story structure which is to be the limited height of all buildings except those for which permits had been issued previous to the fire.

General Mention.

Mr. Charles Edward Hodges announces that having severed his connection with the Leland Stanford Jr. University, after seventeen years' association with the same, he has opened an office at 1123 O'Farrell street, San Francisco. He will give careful and prompt attention to all classes of architectural work and designing. Mr. Hodges already has quite a little work on hand, including a Sorority house in Palo Alto and two residences. Mr. Hodges had planned to go abroad but business has detained him, and his friends are naturally elated.

The Library of Congress is anxious to complete its file of the Architect and Engineer, and the librarian would greatly appreciate the courtesy of the gift of a complete file if any of our readers feel like making the donation. Free mailing labels to be used in forwarding the magazines may be had by applying at the office of the Architect and Engineer, 621 Monadnock building.

Messrs. D. H. Burnham & Co., announce that Willis Polk, formerly of Wright & Polk and William C. Lewis of New York, are now associated with them in their Pacific Coast work and that they are forming in San Francisco an architectural organization for that territory, including a complete corps of designers, constructional and mechanical engineers.

THE BUILDING RECORD.

Permanent and Temporary Structures Planned by San Francisco Architects.

Two Story Brick Building—Alcatraz avenue and Adeline street, South Berkeley.

Architect—William Knowles, Union Savings Bank Building, Oakland.

Owner—J. H. Spring, Berkeley.

Cost—$30,000.

There will be stores on the ground floor and apartments on the second floor.

Mr. Knowles is also the architect of the Wright Block on Center street, Berkeley, which was described in these reports last week. Mr. Knowles is also making plans for several residences to be built at Piedmont.

Fraternity House — Stanford University, Palo Alto.

Architect—Charles E. Hodges, 1123 O'-Farrel street, San Francisco.

Owner--Gamma Phi Beta Sorority.

The architect is ready to take figures on this building, which will be of frame construction, shingled exterior, bungalow type, and modern interior finish.

Brick Warehouse—Fifteenth street, San Francisco.

Architects—Meyer & Ward, Wells, Fargo building, San Francisco.

Owner—San Francisco Development Company.

Cost—$85,000.

Work on this building is under way. A third similar structure will be started as soon as contracts are let. The building will cover a lot 100x188 feet. It will be of brick and four stories high.

Theater—Napa.

Architect—W. J. Cuthbertson, 1231 O'-Farrell street, San Francisco.

Owner—John Hayes.

Cost--$20,000.

The building, upon which work has recently been started, will be of pressed brick, two stories and will have a seating capacity of 1000.

Residence—Pine street, near Polk, San Francisco.

Architect—W. C. Mahoney, 1231 O'-Farrell street.

Owner—Mrs. Roberts, 2630 Sutter street.

Cost—$7500.

This will be the first substantial residence to go up in the burned district, since the fire. The Roberts family had lived in that locality for 40 years and they are anxious to return to it. The house will be up to date in every respect and will contain considerable hard wood interior finish, tile vestibule, marble steps and other features.

Eight Story Building—First and Market streets, San Francisco.

Architects—Meyer & O'Brien.

Owner—Mr. Hooker of Hooker & Lent, real estate dealers.

Cost—$100,000.

The building will be of brick and reinforced concrete. There will be two elevators.

For the Lent Estate the same architects have plans for an eight story office building, Class A, of brick and terra cotta, cost $120,000, to be built at the corner of Post street and Grant avenue.

Bank Building—Alameda.

Architects—Oliver and Foulkes.

Owner—Citizens National Bank.

Cost—$40,000.

Plans have just been completed and figures are being taken for a two story building to be either of stone or concrete. The size of the structure will be 33x100 feet. The bank will occupy the ground floor, with offices above.

Temporary City Hall and Municipal Building—San Francisco.

Architects—Shea & Shea.

Cost--$150,000.

Plans have been prepared for a frame building and bids will be taken as soon as the location has been decided upon. A lot at Eighth and Mission streets has been offered the city for a period of five years. The building will be built either on this lot or on the small park close to the old city hall.

Four Story and Basement Building—South Side of Pine street, west of Van Ness avenue.

Architect—Chas. J. Rousseau, 820 Stanyan street.

Church—San Jose.

Architect—J. Cather Newsom, San Francisco and San Jose.

Owner—First Methodist Church.

Cost—$35,000.

Plans have just been accepted for this edifice which will be erected at the corner of Fifth and Santa Clara streets and will be on the Mission order of architecture. There will be a seating capacity of 1000. The exterior will be plastered, while the interior will be entirely of wood.

Residence—Berkeley.

Architect—A. Dodge Coplin , Bacon Block, Oakland.

Owner—Mrs. D. Ramsey, Piedmont Boulevard, Berkeley.

Cost—$15,000.

The house will be on the mission style, the entire interior will be laced up in a steel net over double diagonal close sheathing. A cement exterior, tile roof, reinforced chimneys and foundations will be features of the building.

Bank Building—First and Santa Clara Sts., San Jose.

Architect—Henry A. Schulze, Atlas Building, San Francisco.

Owner—Bank of San Jose.

Cost—$75,000.

Plans for this building have just been completed. They call for a five-story structure of reinforced concrete and earthquake as well as fireproof in every particular. There will be about thirty offices to a floor.

Hotel—Gough and Sutter streets, San Francisco.

Architects—Coxhead & Coxhead, 2322 California street, San Francisco.

Owner—Gustav Mann, present manager of the Hotel Majestic.

Cost—$100,000.

The building will be Italian Renaissance and four stories. There will be two baths for every three rooms or a total of 185 bath rooms. The main entrance will be on Sutter street, in the form of a semi-circular driveway and court, 30 feet high. There will be a private electric light and power plant.

Lick Baths—Tenth and Howard streets, San Francisco.

Architect—J. W. Dolliver Atlas Building, San Francisco.

Owner—Lick Estate.

Cost—$20,000.

The old bath house was badly damaged by fire and plans are being made for the rebuilding of the structure of reinforced concrete foundations and partitions and brick and terra cotta front. Mr. Dolliver also has plans for an apartment house and two residences.

Apartment House—North side of Sutter street, east of Mason, San Francisco.

Architects—Hemingway & Miller.

Owner—Abe Marshall.

Cost—$125,000.

The building will be seven stories. Class B, buff pressed brick. galvanized iron and bronze. There will be two stores and 120 rooms with 60 baths.

Alterations and Addition—Fourteenth street, Oakland.

Architect—Henry F. Starbuck, Oakland.

Owner—Mackay Furniture Co., Oakland.

Cost—$60,000.

A contract has just been let to John C. Ince of Los Angeles for alterations to the Mackay Company's present building in Oakland and the addition of three stories, making six in all. The front will be taken down level with the top of the second story, to be rebuilt of steel and brick. Up-to-date systems of electric heating will be installed.

Reinforced Concrete Building—West side of Battery street, San Francisco.

Architect—Ralph Warner Hart, San Francisco.

Owner—American Biscuit Co.

Cost—$300,000.

The building will be five stories and will occupy an entire block. R. L. Dunn is manager of the Biscuit Company. Mr. Hart will go East shortly to get ideas which will be embodied in the new building.

Five Story Building—Mission and Minna streets, San Francisco.

Architects—Henry A. Schulze.

Owner — Monroe - Greenwood Estate Company.

Cost—$75,000.

This building is to be Class C, mill construction and will be 160x32 feet, equipped with sprinklers, etc. It will be occupied by the Pacific Coast Paper Company.

Warehouse — Drumm and Pacific streets, San Francisco.

Architects—Armitage & Rowell, San Francisco.

Cost—$10,000.

The building will be built by the day. 80x120 feet and one story. The same architects are at work on plans for a 10 story Class A building to go on Kearney street and a five story steel and reinforced concrete building to be built on California street.

Three Story Brick Building—Front and Oregon Sts., San Francisco.

Architect—Theo. H. Skinner, Atlas Building, San Francisco.

Owner—Henry P. Sontag.

Cost—$18,000.

Plans are now ready and bids are being taken for this building, which will be of mill construction, three stories and basement.

College Dormitory—College Park, San Jose.

Architect—J. Cather Newsom.

Owner—University of the Pacific.

Cost—$20,000.

The building will be on the mission style of architecture, two stories and will contain 56 sleeping rooms. The exterior will be finished in doshed work in Portland cement on metal lath. The space between the studed partitions will be filled with silocel. The roof will be of tile.

Apartment House—Southeast corner of Oak and Steiner streets, San Francisco.

Architect—James Booker, 500 Fillmore street.

Owner—Scott Griffin.

Cost—$75,000.

THE
Architect and Engineer
OF CALIFORNIA

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Vol. V. JULY, 1906 No. 3

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Wm. B. Gester, C. E. - *Artificial Stone*
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LEAVE US SOMETHING

It is unfortunate for California that so many exaggerations of the earthquake should have been sent out. Of course there was no opportunity to censor dispatches at the time they were being sent to all parts of the world, for there were other matters claiming the attention of the authorities then. Not until affairs began to return to their normal state and letters and newspaper clippings arrived did it dawn upon the Californian how seriously the Golden State had been injured by stories of wreck and ruin by the temblor. We learn that some of these reports were filed from points outside the State and we dare say they would have been quite as truthful had they been written in the city or town in which they were given publicity. The impression given the world was that the whole of California had been engulfed, or partly so, at least, by a terrible earthquake and that practically nothing had been left standing.

This brings us to the point which we want to emphasize—the fact that we have a few world famous pieces of architecture left, yellow newspaper reports and graphic magazine writers to the contrary, notwithstanding. These buildings stand up just as majestically, just as impressively, though possibly a little more somberly, because of the devastation about them, as they did before Mother Earth rebelled. We have in mind the Claus Spreckels' building, pictured by the Christian Advocate of London crumbling to pieces under the violent motions of the earth. The Spreckels' building stands today as it stood the day it was finished—a monument to good architecture and workmanship, entirely unharmed by the earthquake, damaged only immaterially by fire.

The Mission Dolores, reported entirely destroyed, was unharmed by either earthquake or fire, while the Cliff House, said to have toppled into the sea, is the same Cliff House today as it was a year ago.

An Ohio architectural publication laments the destruction of the historic Santa Barbara Mission and devotes a number of pages in describing and illustrating the delightful features of this "once" picturesque mission. Anxious that the mistake be rectified and the true conditions be given to the world Sudger Glauber, Father Superior of the mission, has written to the Architect and Engineer as follows:

"Thank God, our old Santa Barbara Mission has not been injured or damaged in the least by the earthquake of April 18, 1906. We scarcely noticed the movement of the earth on that day, although we were in the mission church or about the mission at the time of the shock, 5:15 a. m."

From one of our valued exchanges in Baltimore is printed the startling information that the classic new Custom House was "totally demolished by the quake and fire." A full page is taken up to show an illustration of the Custom House "before the quake." The publication of this would be serious if it were not so funny, since the Custom House has not yet been built, the contractors having only recently completed the excavating.

• • •

CONCRETE TO BE A FACTOR IN REBUILDING

It has become a recognized fact reinforced concrete will play an important part in the upbuilding of San Francisco. The closest adherents to this type of construction could wish for no better showing than that displayed in the recent disaster. In addition to the limited foundtion and fireproofing use of this material which heretofore prevailed, we may expect to see buildings eight stories in height, entirely of concrete, which state of affairs will be a direct result of its recent good behavior.

Naturally, the question of comparative cost of reinforced concrete construction and other forms is a mooted one. Generally speaking, the reinforced concrete building, as far as the structural elements are concerned, is about 25 per cent cheaper than the steel building and the total cost of the former, including finishing, is about 12 to 15 per cent less than the latter for the average building. Compaartive estimates on reinforced concrete building and Class "C" buildings, having brick walls and timber floors, show that there is but little, if any, increase in cost for the former construction over the latter type.

Can anybody claim that a building with brick walls and timber floors is the equal of one entirely of concrete?

W. P. DAY, C. E.

• • •

STATE BOARD'S SUGGESTIONS

The State Board of Architects has made the following suggestions in relation to the restrictions of the new building ordinances in San Francisco.

Thorough inspections and investigations have been made through the burnt district and it has been found that safety is not a question of style of architecture, but quality of workmanship.

Cornices and arches need not be excluded from the new city. Where they were properly anchored and built they withstood the shock and the fire both. It is the opinion of the board that the city beautiful need not be without its picturesque cornices and decorations The Call and Kohl buildings are proof enough that good work on decorations will insure them against destruction.

The pile foundation has been found to be the most substantial. In the earth's vibrations it rests as does a chip in water. And the building rests securely upon it. Forty-five feet is advised as a safe depth for either pile or concrete foundations.

The height makes no difference in the matter of safety. Any building supported by what is known as the cage, steel frame will withstand any ordinary "number nine" shake. It is necessary for San Francisco to have its high buildings. With proper workmanship they can be built in such a way that they will be absolutely safe.

Bay windows are not considered safe. Though it is strongly urged that decorations be permitted, few projections should be allowed.

* * *

THE CEMENT SITUATION

The cement situation is really growing serious. Ordinarily, it would be possible, perhaps, to supply the demand but in view of the great number of reinforced concrete buildings that are going to be put up in the reconstruction of San Francisco, those in a position to know, say it will be next to impossible to supply the demand.

The California cement companies are running their plants night and day and they are also building substantial additions to their works. Foreign cement has been ordered by the ship load and the Eastern market is being called upon to relieve the situation, although heretofore there has been an iron clad agreement that the Eastern product should not be brought into competition with the local output.

The big construction companies have been forced to order their supply abroad. Until it arrives they will have to depend upon the local output for immediate needs. Many would use the California product exclusively if it were possible to get enough as it has frequently been claimed that the cement made here gives better satisfaction in this climate than that imported.

The supply of cement throughout the United States is extremely limited, and it is calculated that a cement mine would be worth as much now as a gold mine. Prospectors are abroad in the State trying to locate mines, and capitalists from the East are on the ground looking into the situation. The cement works in the East have all the orders they can handle in that part of the country, and it is extremely doubtful if much cement can be brought to this city from other points in the United States.

The following figures showing the average annual importation of Portland cement into the United States from 1890 to 1904 and the actual importations for 1905, may be found interesting at this time:

Period.	Barrels.	Value.
1890 to 1894...	2,601,000	$3,415,000
1895 to 1899...	2,013,000	3,115,000
1900 to 1904...	1,863,000	2,497,000
1905	955,000	1,276,000

Thus, in fifteen years the United States has reduced the total imports of cement about 66 per cent, the sales of Great Britain being reduced from an average of $1,610,000 from 1890 to 1892 to $100,000 during the years from 1903 to 1905. In other words, instead of selling to the United States about 50 per cent of its imports of cement it now sells about 5 per cent of these imports.

Up to 1897 the export trade in American cement amounted to practically nothing. From 1897 to 1900 the exports averaged 55,000 barrels annually, with a value of $113,000, as against imports of cement valued at nearly $3,000,000. In 1900, 76,000 barrels, worth $163,000, were exported, and in 1905, 1,067,000 barrels, worth $1,484,000, were exported. The steady growth of this export trade will appear from the following table of amounts and values for the years from 1900 to 1905:

Year.	Barrels.	Value.
1900	76,000	$ 163,000
1901	218,000	439,000
1902	329,000	652,000
1903	271,000	419,000
1904	362,000	530,000
1905	1,067,000	1,484,000

In 1903 the imports exceeded the exports by $3,130,000, while in 1905 the exports exceeded the imports by $210,000. Cement production in the United States is said to have averaged in the years from 1896 to 1899, 12,000,000 barrels, and from 1900 to 1903, 23,200,000 barrels.

We dare say the next three years will see a doubling of the latter figures, if not a trippling, and the San Francisco market will have been largely responsible, too.

* * *

STANFORD WHITE ARCHITECT AND ARTIST

The killing of Stanford White by Harry K. Thaw came as a great shock to the architectural and building world.

There is more than common local interest in Mr. White's death, because only a few weeks previous to the tragedy he had been asked to prepare plans for a number of large office buildings in the city of San Francisco, to replace those destroyed by the recent fire. Among these was a fourteen-story structure for Mrs. Hermann Oelrich.

It is likely that the architectural firm of McKim, Mead & White will complete the drawings. The firm has a reputation that is world wide, and some of the most imposing as well as famous structures of the country were the creations of the genius of Stanford White, while Mr. McKim, the senior member of the firm, was, a year ago, president of the American Institute of Architects.

Madison Square Garden, known in every section of the country, was of Mr. White's creation.

Harry Thaw, the pampered scion of a multi-millionaire, married Evelyn Nesbit, actress, a year ago. In years past Stanford White had befriended her and helped her to success. Jealousy is believed to be the cause of Thaw's act. Stanford White's friends declare, however, such a felling to be without excuse.

Stanford White was born in New York City on November 9, 1853. He was educated at the University of New York, where he was graduated as Master of Arts. At an early age, his remarkable artistic gifts having manifested themselves, he was given the advantage of the highest possible training, and studied architecture with Charles D. Gambrill and H. H. Richardson.

Deciding that the time was ripe for that artistic education which Europe alone can supply, he went abroad in 1878, where he remained for two years, studying and observing with a rarely critical eye the masterpieces of art in France and Italy.

Returning to New York, he then began a career that never has been equalled, from both an artistic and financial standpoint, by any modern architect.

The Washington Arch, at the foot of Fifth avenue, is one of his works. He also designed the new buildings of New York University, the Univerisity of Virginia, as well as the pedestals for the statue of St. Gaudens and other statues in New York.

Mr. White was a fellow of the American Institute of Architects and a member of the best clubs of New York.

Central Iron Works.

The Central Iron Works was fortunate in escaping the big fire which followed the earthquake of April 18. The company's good fortune, in not falling a victim of fire was destined to be shattered, however, for the latter part of June a blaze started in the Florida street factory, that destroyed the entire building. The fire came at a time when the company was rushed with work, but its energetic managers, the Devotos, were not discouraged, and already the burned building has been rebuilt and business is proceeding with little or no interruption.

The Publisher's Corner

Roman Stone.

It has become generally recognized among architects and builders that concrete stone has many physical advantages over any natural stone, but it remained for the manufacturers of Roman Stone, fabricated according to the Stevens patents, to produce a product which in beauty and finish and texture would compare with natural building stones.

In almost all products made with Portland Cement as a bond the color is uniformly dead grey and the surface has a different texture than its interior which makes it impossible to cut or otherwise hand finish it.

Roman Stone has the life like look of living rock and a homogeneous texture which makes it possible to hand cut. It can be colored.

Most cement stone is manufactured by tamping a slightly moistened mixture of gravel, sand and cement into a rigid mould. Such a process robs the cement of its greatest necessity, that of water. This also makes a porous stone.

Roman Stone is cast into an absorbent mould which automatically takes up, holds, and returns to the cement the proper supply of water.

Roman Stone can be cast to meet any design at a slight expense over plain face work and the result is perfect.

All the rock used in the manufacture of Roman Stone is quarried and passed through breakers and mills which size it from 1-4 in. down to sand. The voids are carefully determined while the amount of cement used is in accordance with the highest engineering standards. The mixture is poured into the molds in the consistency of a thin grout and the result is a regular product.

Roman Stone is guaranteed to be absolutely fireproof.

The Holmes Lime Company, Inc., Mutual Bank building, San Francisco, are the Pacific Coast agents.

The Lennox Furnace.

The Pacific Blower & Heating Company has erected a large factory at 3261 17th street and is in fine shape to fill all orders for heating and ventilating apparatus. The factory is 60x110 feet, with a 7½ foot basement, making virtually two floors. The company has secured the exclusive agency on the Pacific Coast for the famous Lennox furnace. For twelve years the Lennox company has employed an expert heating engineer to study heating problems, and the steel furnace has been the result. Simplicity of construction has overcome all difficulties while at the same time greatly reducing the cost of manufacture. So much so that while it is not the cheapest furnace on the market, because it has quality, yet its price is not made so high by its factory cost as to keep its makers constantly apologizing. A solid steel shell, riveted by powerful machinery like a boiler, as dust proof and as gas tight as any steam boiler, covers fire pot, ash pit and all. There is not a packed joint of any kind to leak gas nor is the oxygen burned out of the air by coming in contact with the super-heated parts. A larger volume of air is heated at a lower temperature and at less fuel cost. Steel radiates heat quicker than iron and the upright steel walls do not collect ashes to retard radiation as does the horizontal construction.

The Lennox company was a pioneer in making steel furnaces. Today it manufactures more steel furnaces than any other one company in the United States.

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Peninsula Onyx.

The New Pedrara Mexican Onyx Company at San Diego, has opened an office in this section and Lew C. Black, with headquarters in the Bacon Building, Oakland, has been appointed special representative. Architects and prospective builders will do well to investigate this peculiar type of stone which has been pronounced by those who have used it as a most excellent material for the finishing or fixtures of fine residences, hotels, office buildings, theaters, churches etc.; for the counters and fixtures of banks, drug stores and bars, in the manufacture of furniture such as sideboards, china closets, table and stand tops, pedestals, etc., and for tomb stones, monuments and vaults, or in fact, in any place or for any interior work where any stone can be used.

The Peninsula Onyx took the first prize and gold medal at the Chicago World's Fair. Onyx comes in various colors, from pure translucent pearl white to stone closely lined in the rose, green, yellow, brown or orange. It can be used in combination with dark granites or marble with beautiful effect. It is easily worked and polished, the finish is most durable and is not affected or stained by acids, rust or ink. Its the only Onyx to use.

Berkeley's Gain.

A transaction of the greatest importance to Berkeley was concluded when the Van Emon Elevator Company took a ten years lease from the Berkeley Home Building Association on the site at the southeast corner of Allston way and Third street. The land has a frontage of 300 feet on Third street and is directly on the main line of the Southern Pacific's eastern and local tracks. The Berkeley Association also entered into an agreement with the Elevator Company to commence the immediate construction of factory buildings at a cost of $15,000. The main building will have a frontage of 200 feet on the railroad and a depth of 60 feet. Smaller buildings and shops will be erected, as will also a foundry, machine and pattern shop.

While the factory will for the first few months employ a good many men, it is planned to have a force of at least a hundred when the works are in complete operation. It is stipulated in the contract that the buildings must be finished by the first of July.

The new factory will be completely equipped to make its own castings. A line of the tools and machinery necessary have already been ordered from the East.

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New Oakland Building.

Contracts have been let in Oakland for a four-story modern brick building at the northeast corner of Sixteenth street and San Pablo avenue. The building will have a frontage of 65 feet and a depth of 100 feet. The owner is Dr. Samuel S. Kahn, brother of the members of the well known Oakland dry goods firm of Kahn Bros., at Twelfth and Washington streets. The building is to be divided into stores and lofts and will represent an expenditure of $60,000.

Trade Notes.

The Richter Manufacturing Company of Tenafly, N. J., manufacturers of burlap, canvases, etc., announce that they are now represented in San Francisco by Messrs. Haas and Lenhardt of 2003 Golden Gate avenue. Mr. S. C. Abbott is no longer connected with the company.

A. Breslauer is fortunate in having ready for immediate delivery more than 3000 barrels of the celebrated "Lion" artificial Portland cement, manufactured by Dufossez and Henry of Cronfester, Belgium. There has already been a big demand for this brand of cement as well as other standard brands which Mr. Breslauer also carries. His office is at the Builders' Exchange, Oakland.

The average building requires some hand carving to meet the architectural requirements and the more there is of this work the more expensive the building becomes.

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Second or browning coat—One part Empire hard wall plaster, two parts clean sharp sand floated up even with grounds.

White or putty coat—One part Empire finishing plaster, three parts line putty gaged with hard wall plaster.

Sand finish—One part Empire hard wall plaster, two parts clean sharp sand.

Wood lath, two-coat work—One part Empire hard wall plaster fibred, two parts clean sharp sand (fresh-water sand preferable), mixed thoroughly and applied within two hours after mixing.

White coat and sand finish same as for metal lath.

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As a result of the San Francisco fire, the Carnegie Brick Company, Livermore, Cal., has had so many orders that a large field kiln has been built, which will accommodate one million of the white fire brick at one time, and is heated by eighteen oil burners. The entire plant will be kept running night and day for months to come.

Mr. H. W. Robbins, special representative of the Pioneer Roll Paper Company of Los Angeles, who has been traveling through Arizona, New Mexico, Colorado, Utah, and the northern states on this coast, left San Francisco on the last steamer for Honolulu, China, Japan and Manila, in which countries he will establish agencies for Pioneer Ready Roofing. Mr. Robbins will be absent for four or five months.

When it comes to reaching out and exploring new territory for business, the Pioneer Roll Paper Company is one of the most progressive firms in California and it is only in response to the numerous inquiries for their goods brought about by consistent and liberal advertising, that they have ventured into these far off countries.

By a typographical error in the June Architect and Engineer the name of the Portland cement carried by W. R. Grace & Co., was made to read Lesson instead of Josson. Grace & Company also carry several other brands of best Belgium and German Portland cement and would be pleased to give contractors figures on same.

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Vacuum Cleaning Plants.

It is now becoming a recognized fact that one of the most important adjuncts of a modern building is a sanitary sweeping and cleaning system. This machinery has been brought to such a perfect state, that public buildings, theaters, hotels and apartment houses can no more afford to be without one of them, than without an elevator, or other modern convenience.

Sweeping by means of vacuum or compressed air and vacuum combined, not only keeps a building clean and sanitary, but adds years to the life of carpets and upholstered furniture. These plants have become so well known that a prospective guest or a tenant of a hotel or an apartment house almost invariably asks whether the building is equipped with a Sanitary Sweeping System.

Every architect in drawing up plans for new buildings now gives the matter of a compressed air and vacuum cleaning plant as much consideration as any other detail connected with the building.

These plants are being rapidly introduced and are now recognized as a necessity. People have everywhere availed themselves of the opportunity to have their houses thoroughly cleaned from cellar to garret without disturbing the occupants or contents by the portable service. Houses are given pure and fresh ventilation by means of compressed air with sufficient force to carry with it all dust, germs and disagreeable accumulations. Theaters, hotels, and apartment houses without the equipment of a sanitary plant will soon be more difficult to find than those thus equipped. The Sanitary Devices Company of San Francisco is temporarily located at 1925 Octavia street.

The Sanitary Devices Manufacturing Company, whose works were formerly at 317-321 Mission street, have leased a large piece of ground on the corner of

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The firm of R. M. & H. Askin, plumbers at Visalia, are one of the oldest in the business in the San Joaquin Valley. Herbert Askin, the junior member of the firm, has followed the trade nearly 11 years and he is recognized as one of the most reliable craftsmen in the county. Among the buildings which this firm has supplied with plumbing fixtures are the Hyde Bank and Business Block, First National Bank Building, Vucovich and Kaweah Club Buildings, residences of Judge N. O. Bradley, R. E. Hyde and many others. R. M. & H. Askin did the cornice work for the Auto Hardware Company, which is a handsome piece of work. The firm also furnished the cornice for the Carnegie Library, a handsome little building built of gray brick and granite. Besides general plumbing the firm carries quite a large line of pumps, tanks, troughs and windmills. Heating and ventilating is specialized and among the buildings which have been equipped with modern heating systems are the Carnegie Library, Bradley and Hayes residences.

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The Otis Elevator Company is now installed in its new home at the junction of Stockton, North Point and Beach streets, San Francisco. The location is an ideal one for the company's business and is easily reached by the Kearney street cars. A building 275 feet long and two stories high has been constructed and when all its machinery arrives the Otis Company will be in a position to handle double the volume of business that it did before the fire. Manager Berger is optimistic of the future He has strong faith in San Francisco's future and believes the city will be bigger and more beautiful than it ever was in less than fifteen years time. The company's offices have also been moved to Stockton and North Beach streets.

The Bass-Heuter Paint Company is now located in its new quarters at 1814 Market street, just above Van Ness avenue. The company has displayed great enterprise in building a temporary home so promptly. The Bass-Heuter paints have a reputation all over the Coast and the demand for them has been almost phenomenal since the fire. It is only a question of time before the company will be installed in a building as pretentious as the one destroyed by fire.

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"If a thing is worth doing, it is worth doing well," is the proverb selected by the Tibbetts Roofing Company. Mr. O. B. Tibbetts, who manages the affairs of this concern, has done satisfactory work in ready roofing and gravel roofs, as well as roof repairing and roof painting in Stockton, Oakland and San Francisco. At present the main headquarters of the Tibbetts Roofing Company is at the Builders' Exchange, 425 Fifteenth street, Oakland, where estimates are given. In Stockton, orders may be registered at 529 E. Main street. Since the earthquake, O. B. Tibbetts has also contracted quite extensively for brick work, and is prepared to submit figures for foundations, chimneys, repair and general brick work. Attention is called to the advertisement of the company in this issue of The Architect and Engineer.

The C. S. Pierce Lumber Company of Fresno, is centrally located and carries an immense stock of all kinds of lumber and other building material, and on account of its exceptional facilities for buying can give its patrons first class service. The leading contractors and buyers of Fresno find it convenient and profitable to deal with this firm. Mr. C. S. Pierce, the President of the firm, is the pioneer lumberman of Fresno, having been in the business here continuously for the past twenty-five years and by his fair treatment and careful attention to the interests of his customers has built up a splendid trade.

New Terra Cotta Plant.

W. F. Barnes, president of the W. F. Barnes Commercial Company, has purchased the clay and terra cotta plant at Antioch, California. This plant has not been in operation for some years. It is situated on the Southern Pacific Railroad, within a short distance of the depot at Antioch. The plant will be capable of handling 150 tons of clay per day, and it is Mr. Barnes' intention to build an addition as speedily as conditions will warrant.

The company that will handle this proposition will be the California Brick and Clay Manufacturing Company, which will be controlled by Mr. Barnes, who holds the majority of the stock.

Mr. John G. Treanor, who has been associated with Mr. Barnes for the past few years, will be the general manager of the company, and Mr. E. T. Maple, who is an expert in the clay manufacturing industry, will be the general superintendent of the works and this of itself will be sufficient guarantee that the very best terra cotta, piping, etc., will be turned out at the plant.

It is also probable that a little later on a good many brick will be made at this plant, as it is admirably situated for the very best clay, and sufficient

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clay land has been secured for fifty years' operation, estimating two hundred tons a day.

The company is incorporated for $500,000, and it is proposed to start up the first or middle of August. The plant is now being thoroughly overhauled and put in good condition with new machinery, etc. The location at Antioch affords competitive shipping facilities, there being the Southern Pacific, Santa Fe, and water transportation.

It is proposed in the near future to establish a sand-lime brick plant of the Schwarz "Scientific System," as an abundance of good sand is at hand, and lime rock, so that the company will burn their own lime.

Mr. Barnes will go East about the first of August for the purpose of purchasing machinery for an entire plant to be installed at El Paso, Texas, and also for a plant to be installed in the vicinity of San Francisco. The plant at El Paso will be a large one to turn out 40,000 brick per day, while the one at San Francisco will run over a hundred thousand per day Mr. Barnes expects to be in the East about four weeks, and will visit most of the machinery people as well as a good many of the sand-lime brick and clay plants, also purchasing some machinery for the Antioch plant. Generally speaking, the outlook is very bright for the brick and terra cotta business.

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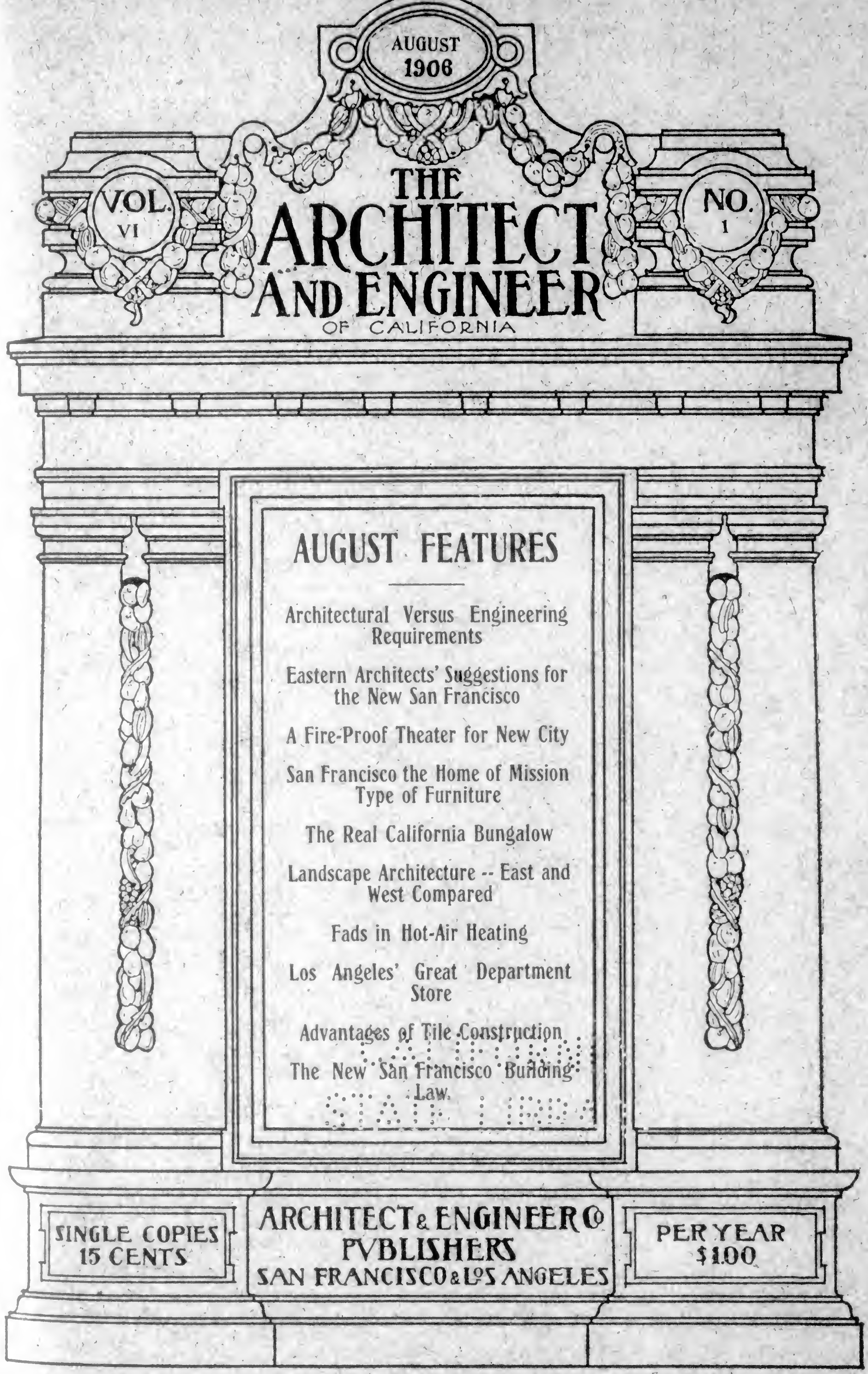

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1906

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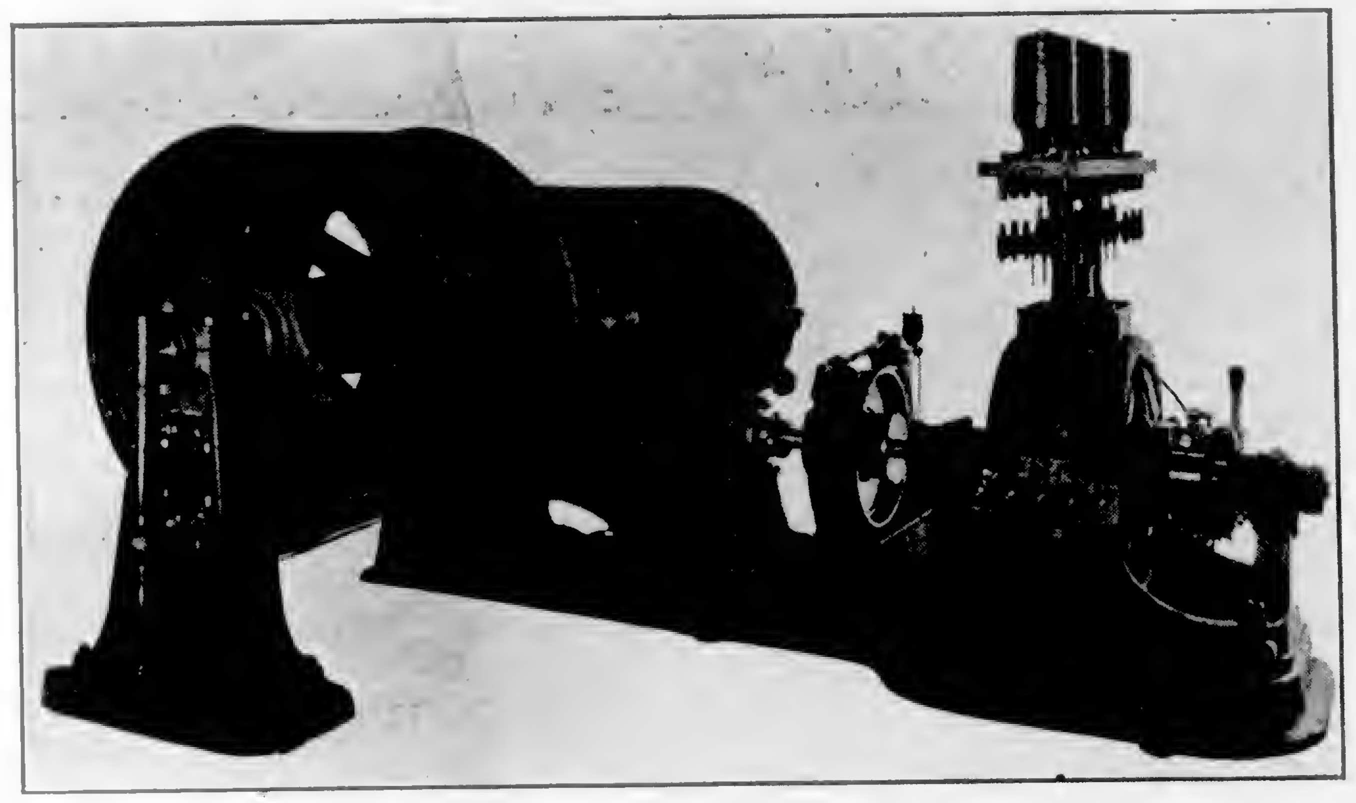

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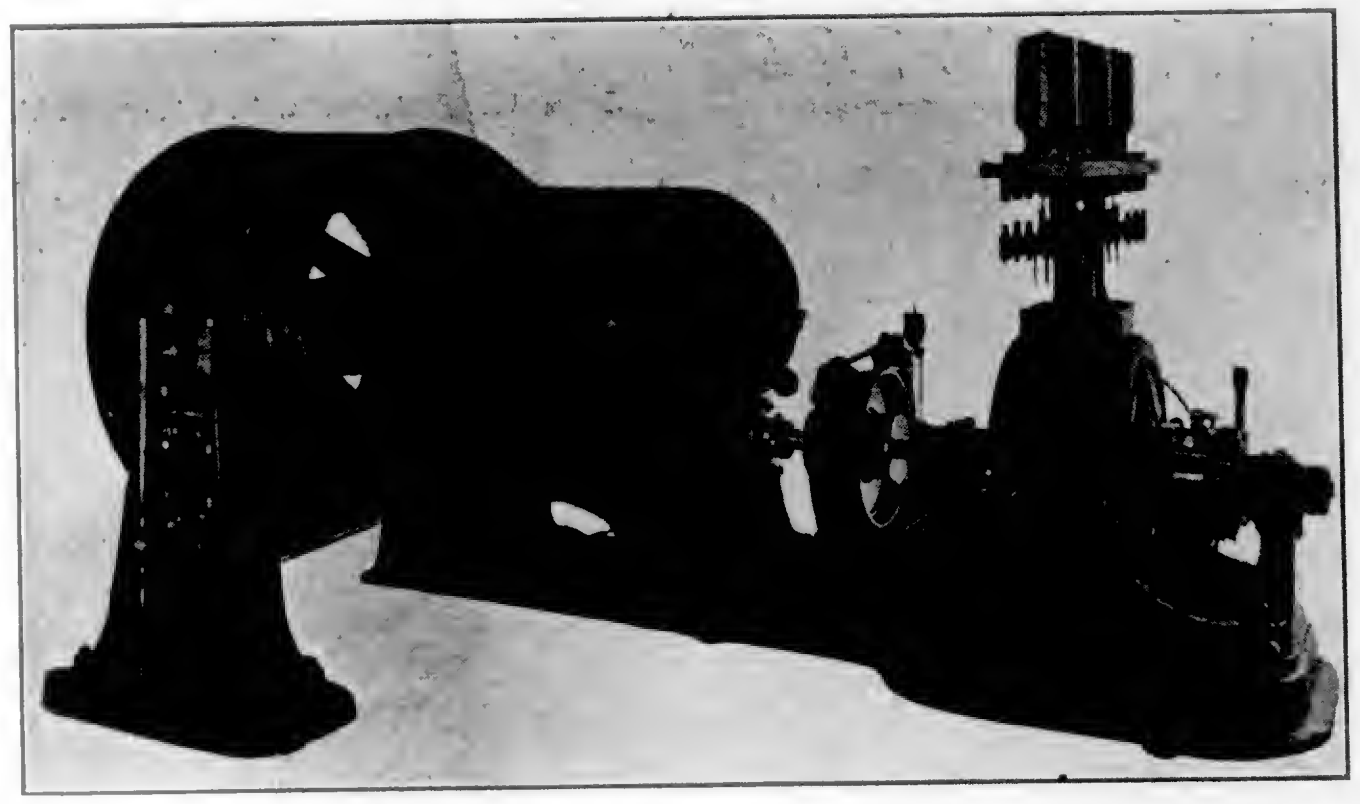

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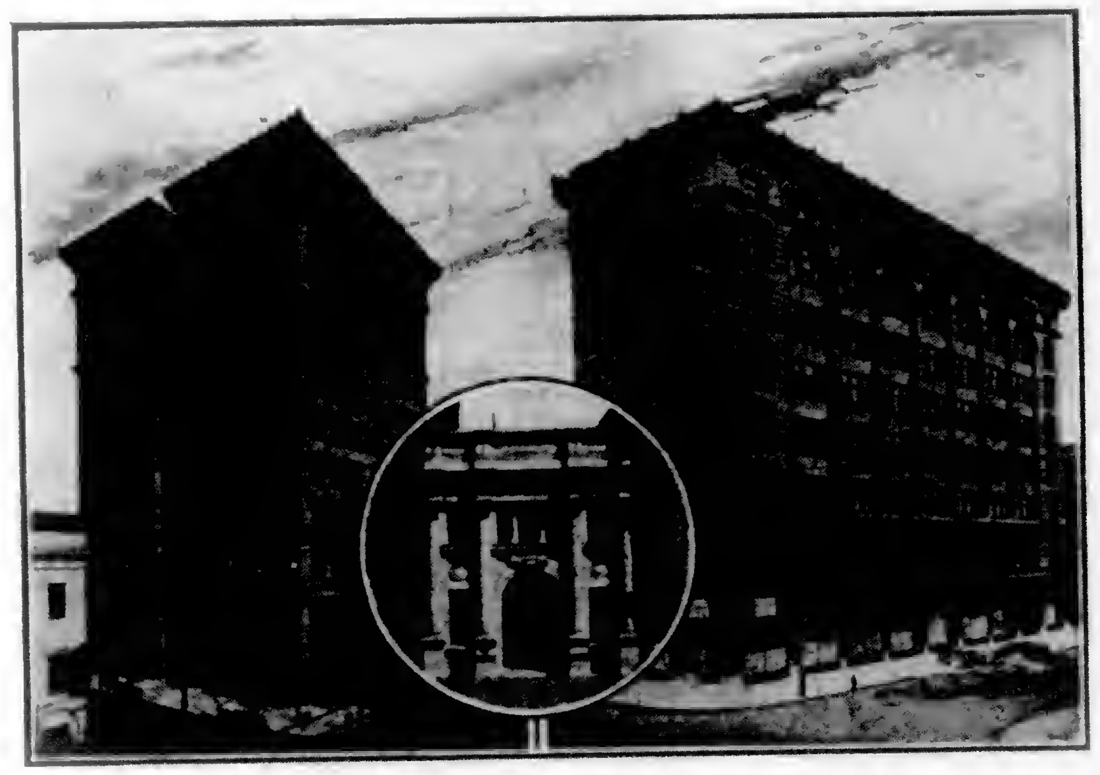

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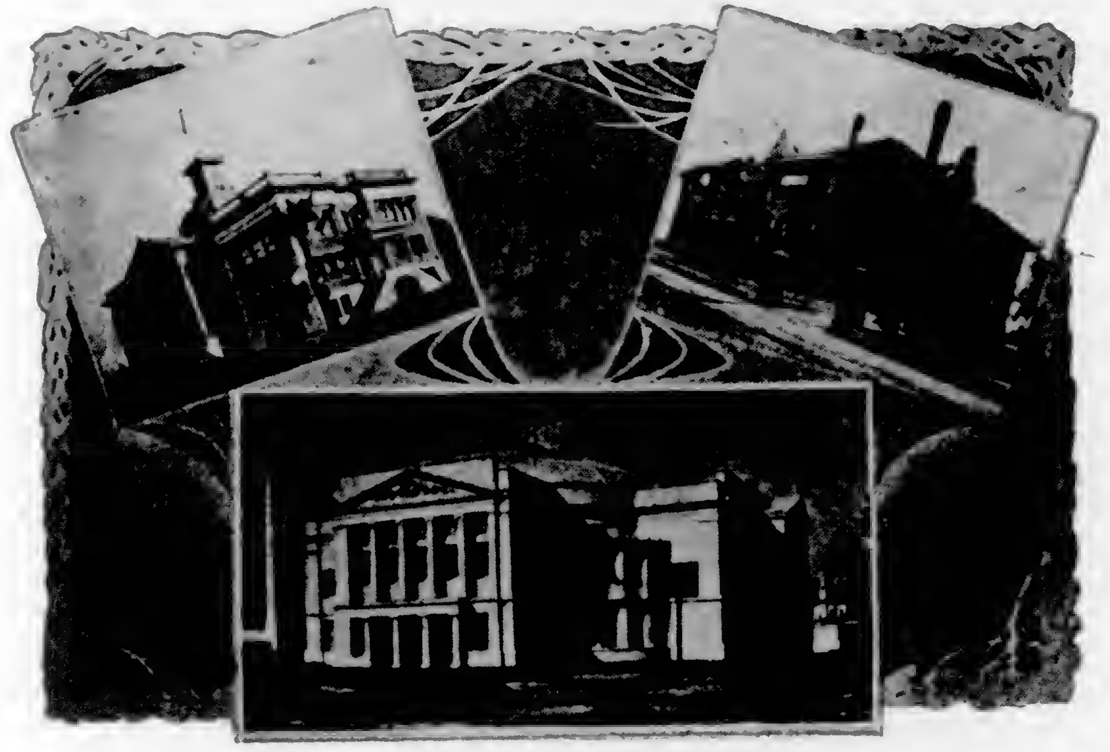

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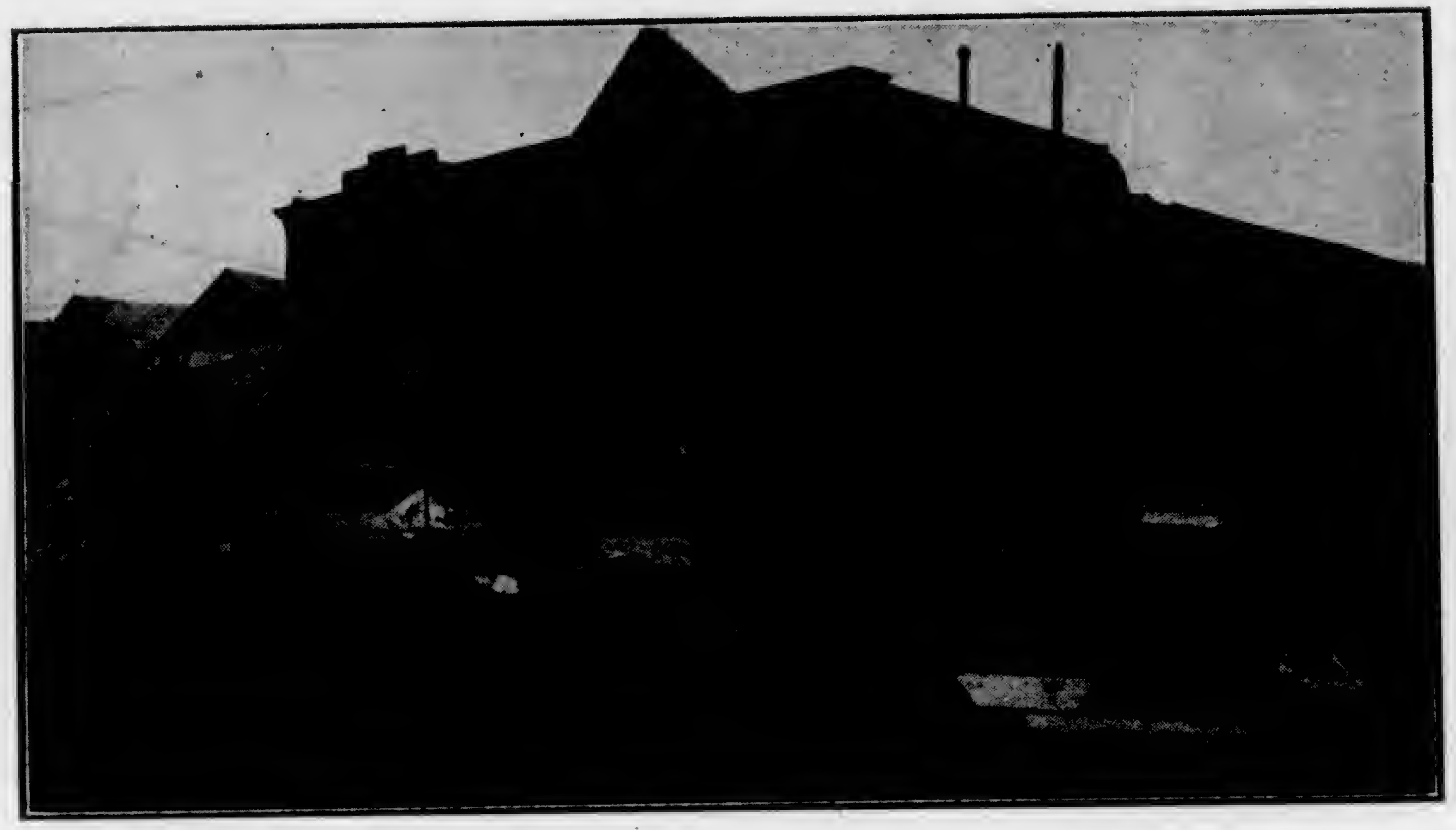

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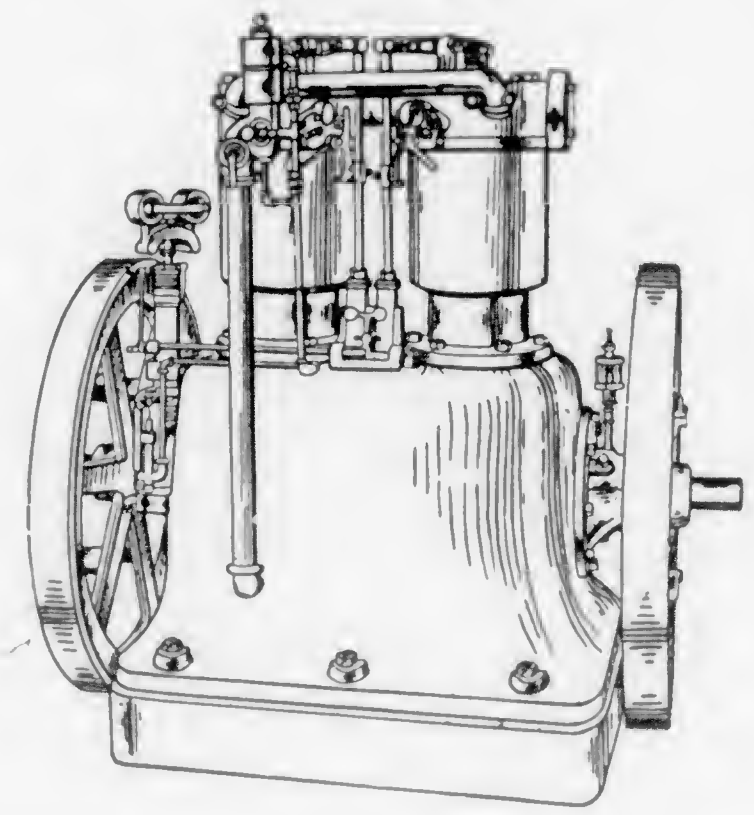

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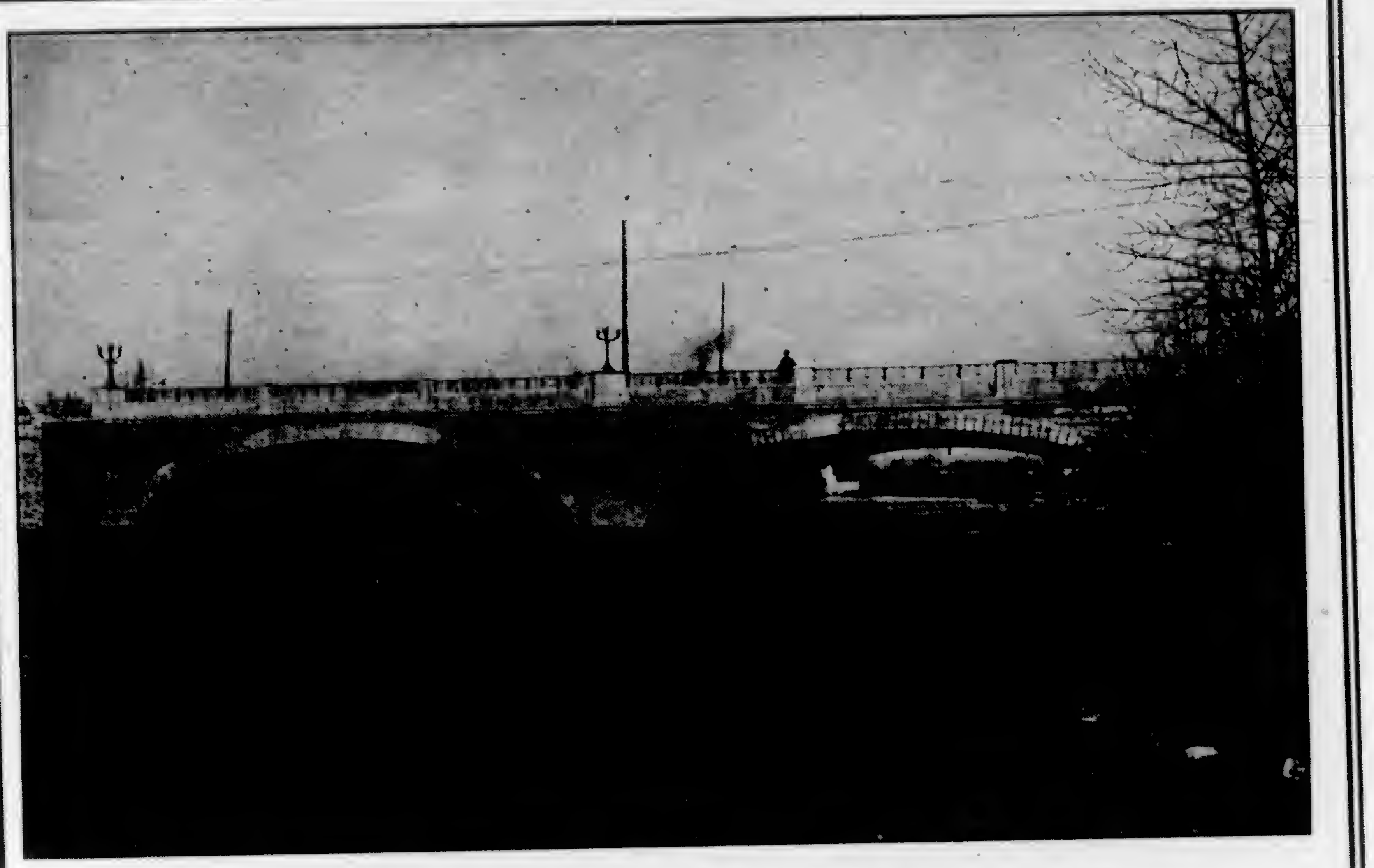

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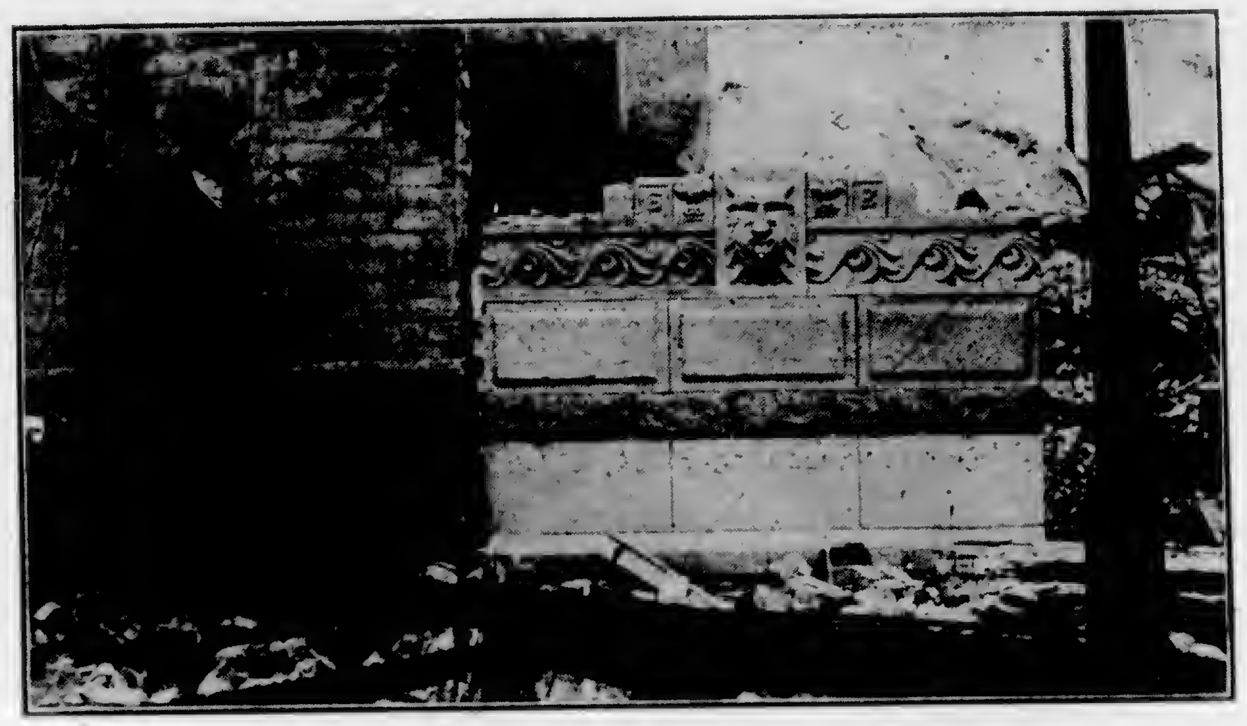

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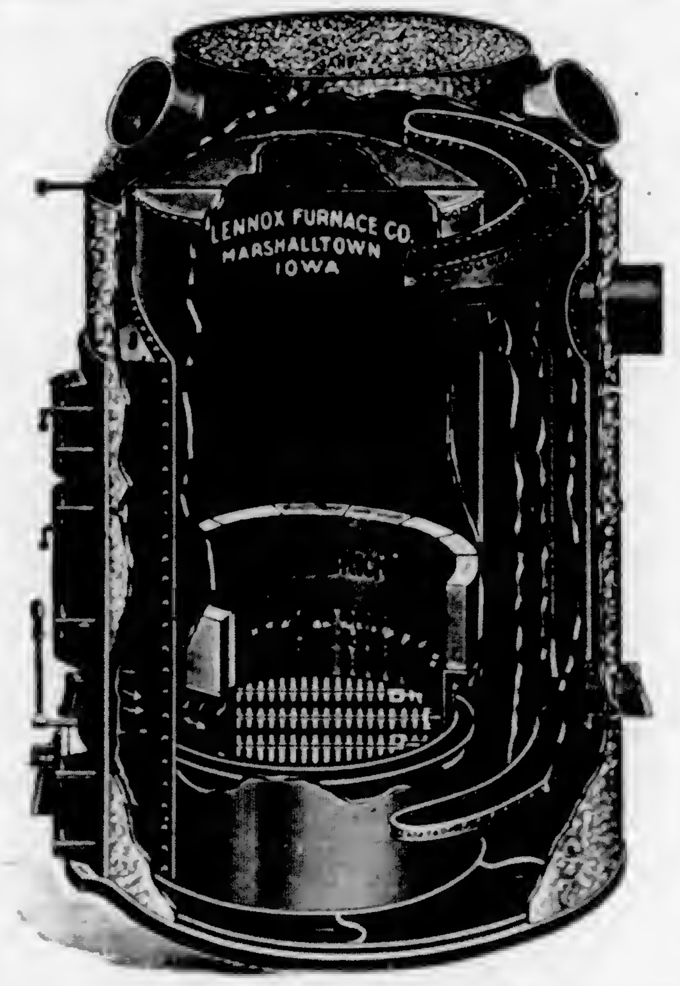

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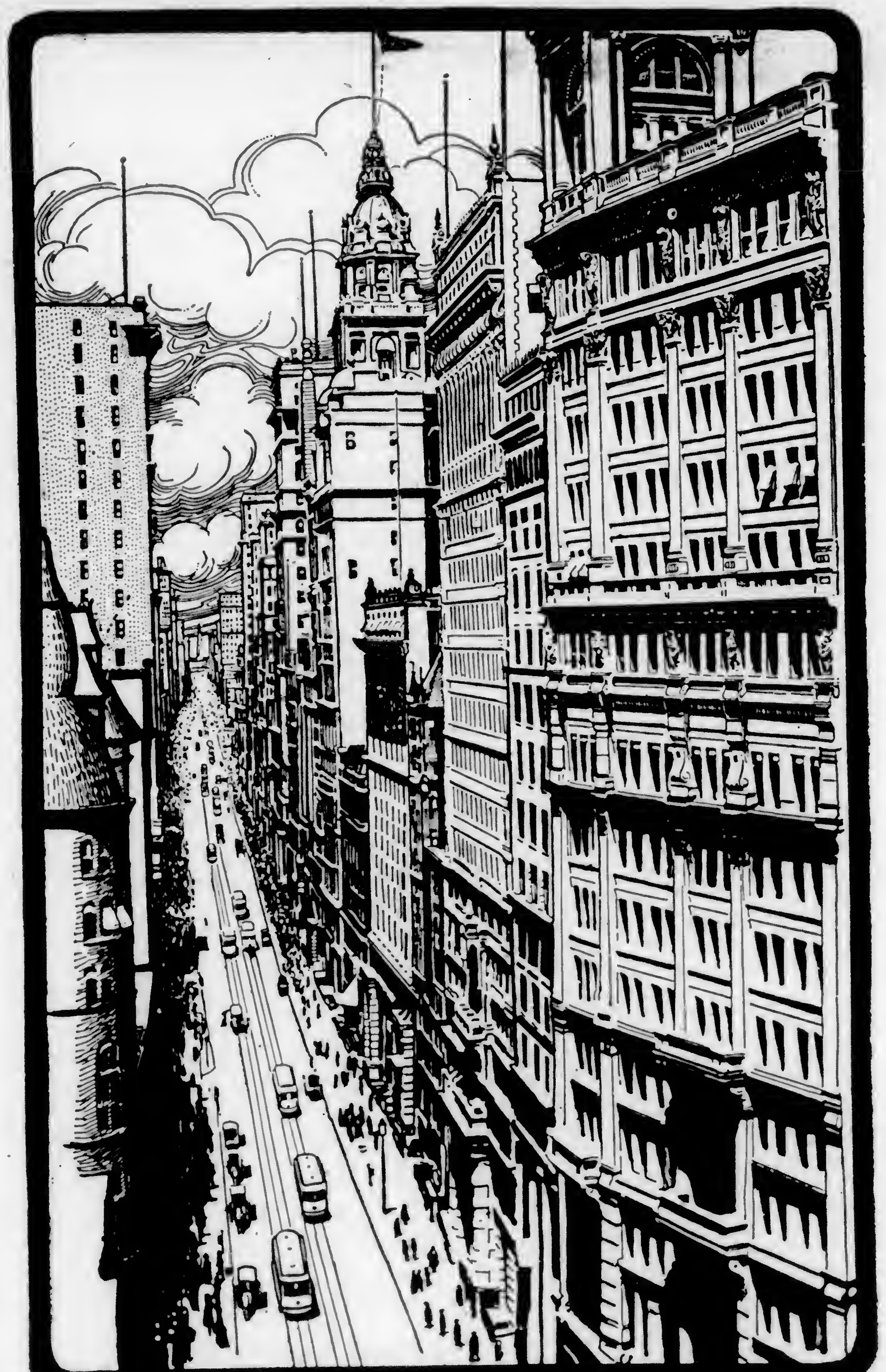

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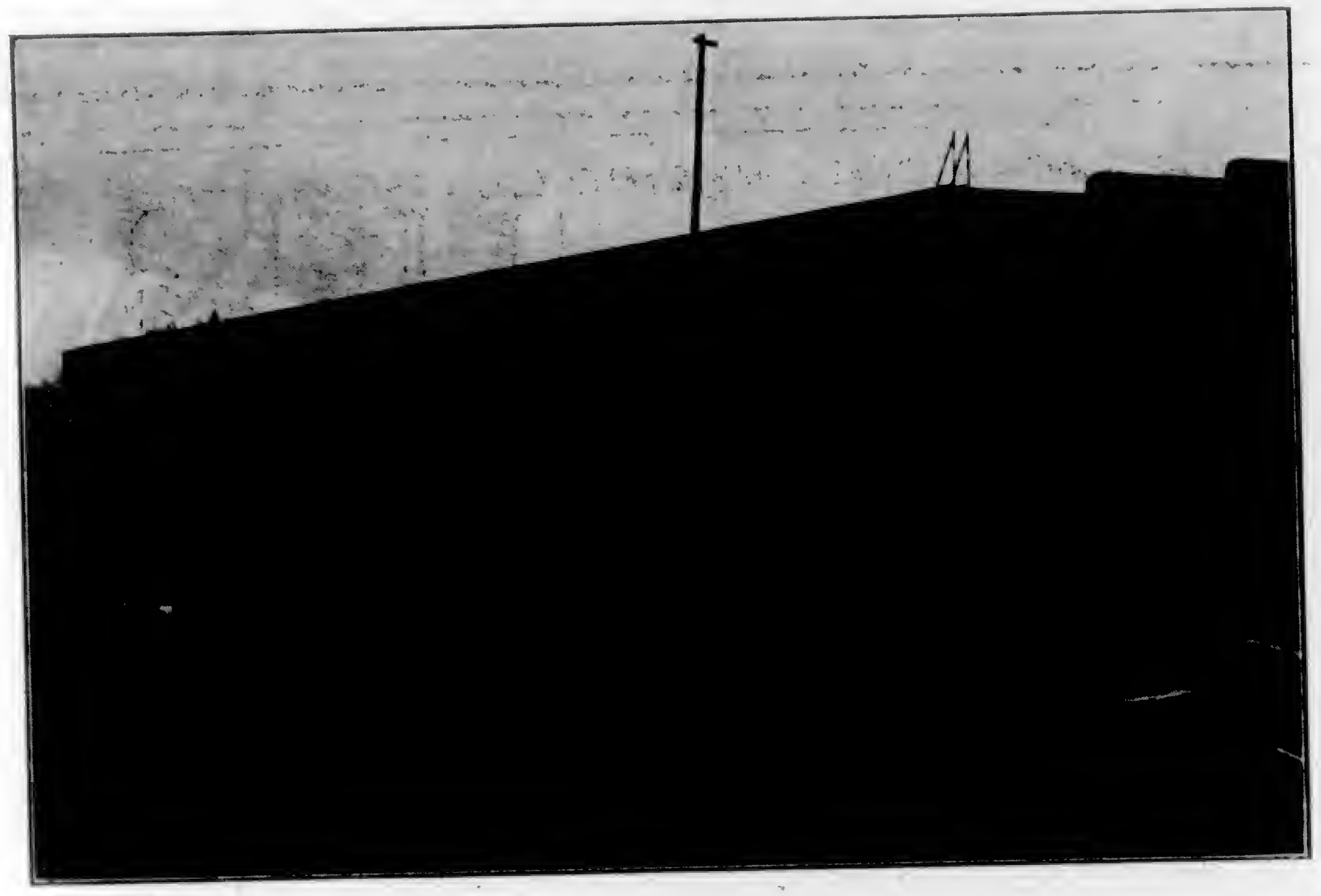

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Contents for August

PAGE

Frontispiece—The Old California Mission and its Influence on Modern Design - 18

A Fireproof Theatre for the New San Francisco - *Charles F. Archer, C. E.* 19

Illustrations by the Author and Harley G. Corwin

Make Fireproofing Materials Bear Building Stress - - - - - - - 25

The New Building Law of San Francisco - *W. J. Cuthbertson, Architect* 27

The Real California Bungalow - - - - - *A. W. Smith, Architect* 31

Illustrated with Photographs of a Smith Bungalow

More Thuds from the Padded Cell. A Verse - - - - - - - - 34

Architectural versus Engineering Requirements - *Henry A. Schulze, Architect* 35

A Mammoth Department Store - - - - *A. F. Rosenheim, Architect* 37

What Neighboring Architects Suggest for the New San Francisco - - - - 41

Terra Cotta and Brick—

Think Terra Cotta Tiling for Floors a Failure - *John D Galloway* 45

Bricklayers of Thirty Years Ago - - - - - - - - - - - 47

Brick that will Stand Fire - - - - - - - - - - - - 48

Tile Construction - - - - - - - - - *W. E. Dennison* 49

Brick Famine at Salt Lake - - - - - - - - - - - - 50

Cement and Concrete—

A Discussion of a Reinforced Concrete Arch - - - - *A. V. Saph* 51

Illustrated with Photograph and Drawings

Cement Sidewalk Construction - - - - - - - - - - 56

Heating, Lighting and Electrical Work—

Fads and Fallacies in Hot Air Heating - - *R. S. Thompson* 59

A Modern Heating System - - - - - - - - - - - - 62

Advantages of Electrical Cooking - - - - - - - - - - 64

Women as Builders - - - - - - - - - - - - - 65

Interior Decoration—

Artificial Lighting and the Decorator's Relation to It - *C. Walter Tozer* 66

San Francisco, the Home of Mission Type of Furniture - - - - 68

Landscape Architecture—

A Comparison of Planting Methods of Southern California and the East - - - - - *Wilbur David Cook, Jr., Landscape Architect* 69

Among the Architects—70

Editorial—75

Publisher's Corner—76

An Old California Mission

Cathedral, Los Angeles, Cal., Maginnis, Walsh & Sullivan, Architects

THE OLD CALIFORNIA MISSION AND ITS INFLUENCE ON MODERN DESIGN

THE
Architect and Engineer
Of California

Vol. VI. AUGUST, 1906. No. 1.

A Fire-Proof Theatre for the New San Francisco

By CHARLES F. ARCHER, C. E.

DESIGNING a theatre building for the new and greater San Francisco, under and in accordance with the new building ordinance is a task requiring infinite attention to detail.

The demands of the man behind the scenes, of the fire marshal, of the building inspectors, and of the theatre-going public, must be satisfied and must be made to harmonize with those of the man in the box office. The accompanying illustrations show an attempt to solve this problem.

This building is being erected for Messrs. Belasco and Mayer, the former proprietors of the Alcazar and Central Theatres, of San Francisco, and owners of the Belasco Theatre, of Los Angeles. It has been designed and is being built by Archer & Corwin, architectural engineers.

The building is situated on the southwest corner of Sutter and Steiner streets, 96 feet 3 inches on Sutter street and 137 feet 6 inches on Steiner street. The building covers the entire lot with the exception of an eight-foot passage along the west lot line from the proscenium wall to Sutter street. The main front of the building is on Sutter street and is designed after the old Spanish. The main entrance to the theatre is through a lobby leading from the center of the Sutter street front, on one side of which is located the box office and manager's private office.

There will be a confectionery store on the corner and a cafe on the west end of the front.

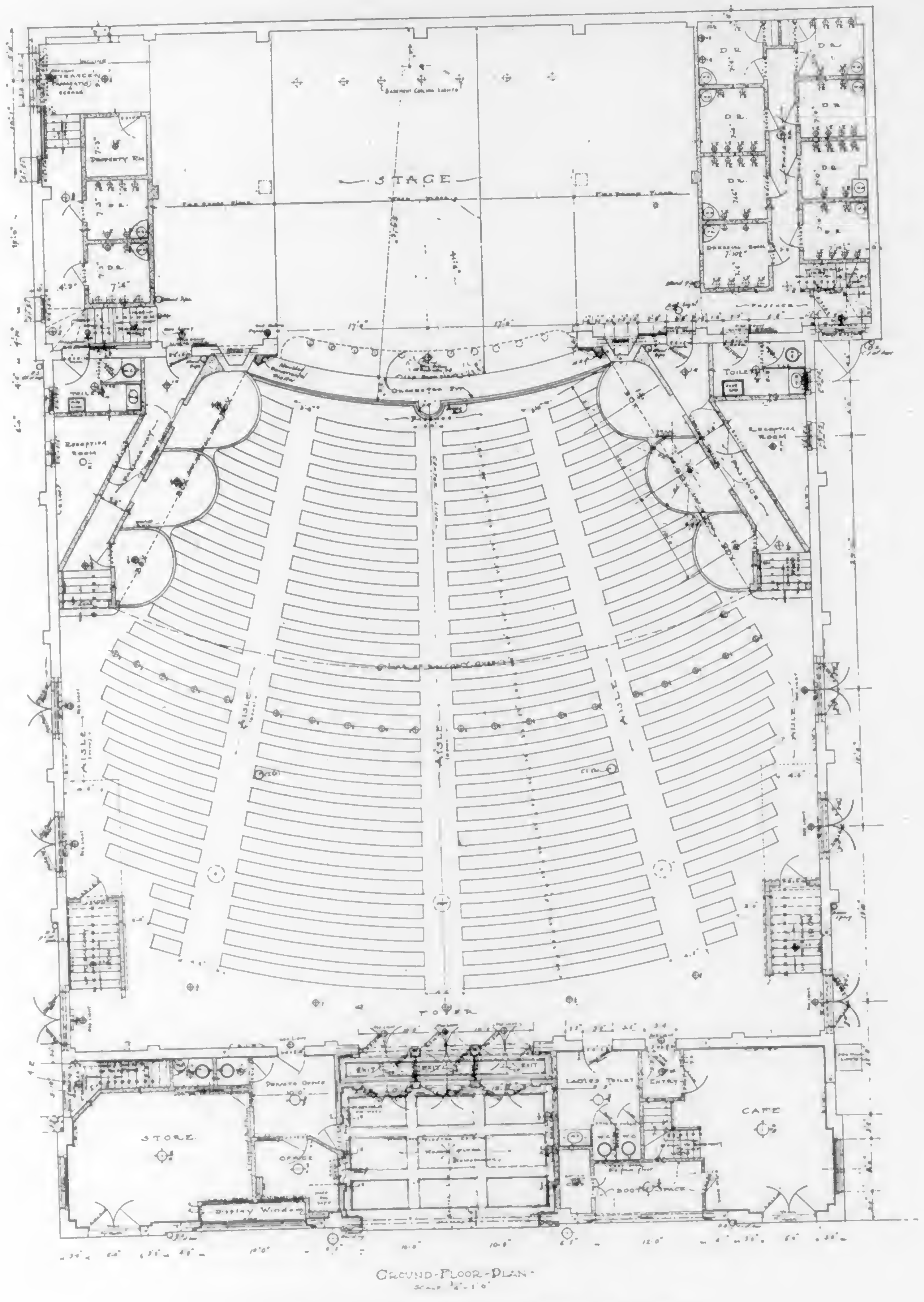
Between the lobby and cafe, with an entrance leading from the auditorium, there will be a ladies' parlor, which it is intended to furnish with every convenience for the comfort of ladies and children.

The second floor over the lobby and stores contains seven offices having an entrance from Steiner street and having no connection whatsoever with the theatre.

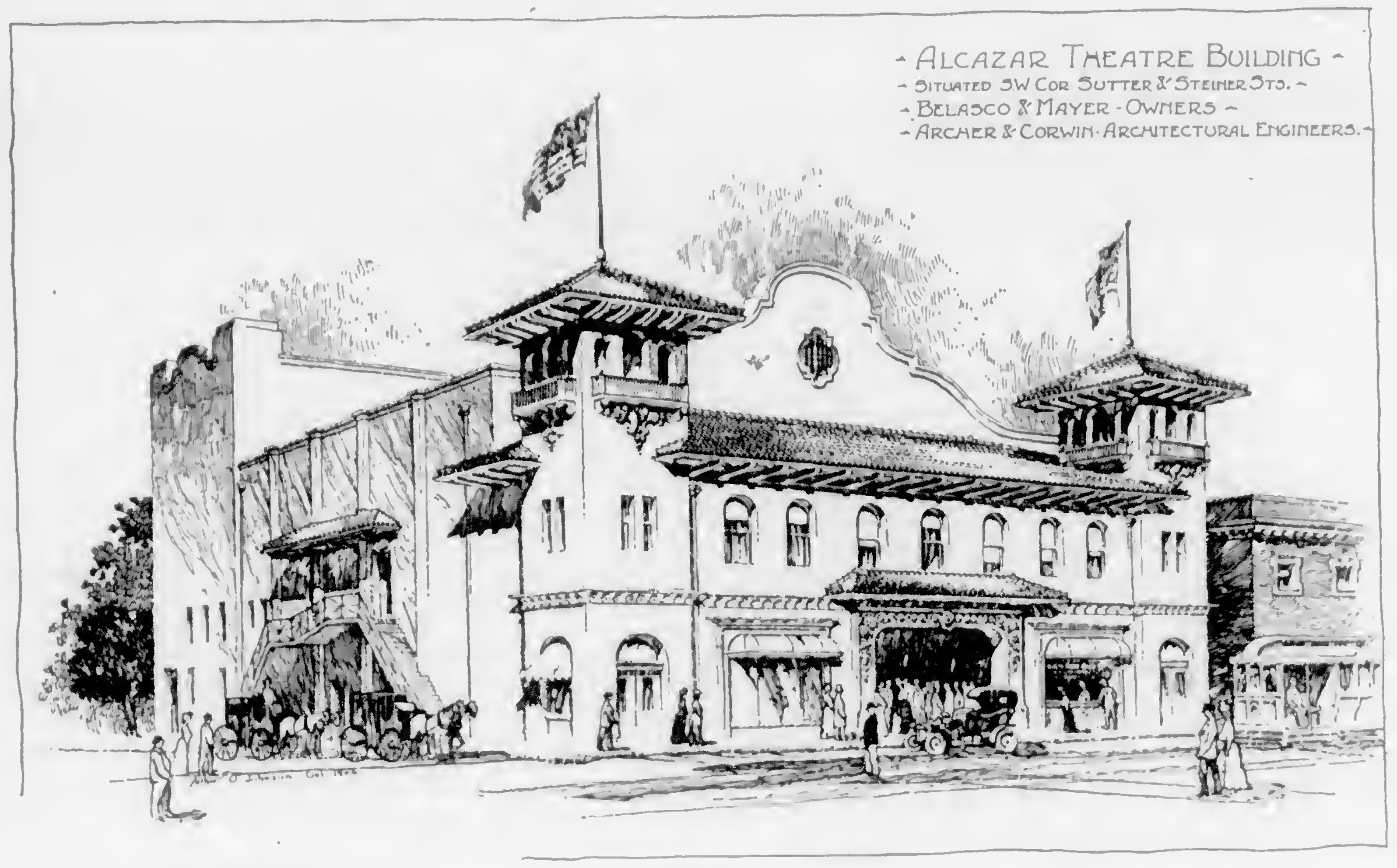
The main auditorium is seventy-seven feet long and eighty-eight feet wide, and contains one balcony and twelve boxes. The seating capacity is 1474. The balcony is supported on two columns so located that there is a clear view of the stage from every seat in the house. The sight line from the balcony allows the footlights to be seen from the rear row of seats.

The box fronts leave the proscenium wall at an angle of sixty degrees, which will allow persons seated in the boxes a very full view of the stage.

The floor of the auditorium slopes toward the stage about one foot in every twelve feet. The orchestra pit is sufficient to accommodate the



Ground Floor Plan of Alcazar Theatre, San Francisco
Chas. F. Archer and Harley G. Corwin, Engineers


- ALCAZAR THEATRE BUILDING -
- SITUATED S.W. COR. SUTTER & STEINER STS. -
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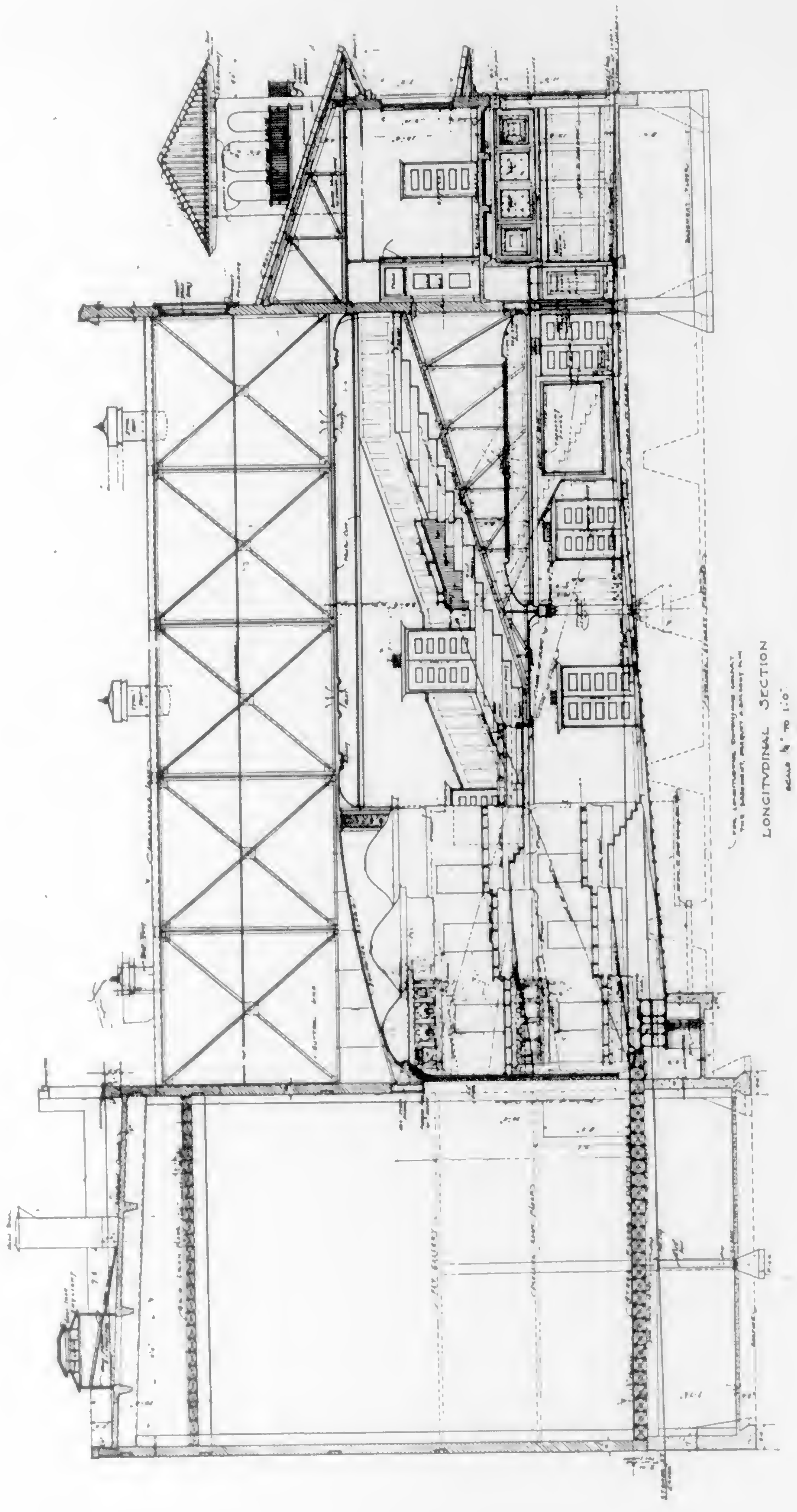
largest orchestra required for opera productions, and as will be seen upon examining the longitudinal section herewith given, is located partly under the stage, the leader occupying a semi-circular niche projecting into the center aisle. The pit is six feet deep and only the leader will be seen by the audience. The back wall of the pit will be of hard wood, forming a sounding board. This feature is an innovation in San Francisco but has been used successfully elsewhere.

The ornamentation of the auditorium is to be stucco and in design contains a suggestion of the Moorish, as the name "Alcazar" implies. Most of the ornamentation is applied to the boxes and proscenium arch, plain wall surfaces, appropriately colored, being considered more effective than masses of applied ornament and being much less expensive. There is to be a paneled wainscoting six feet high throughout the auditorium.

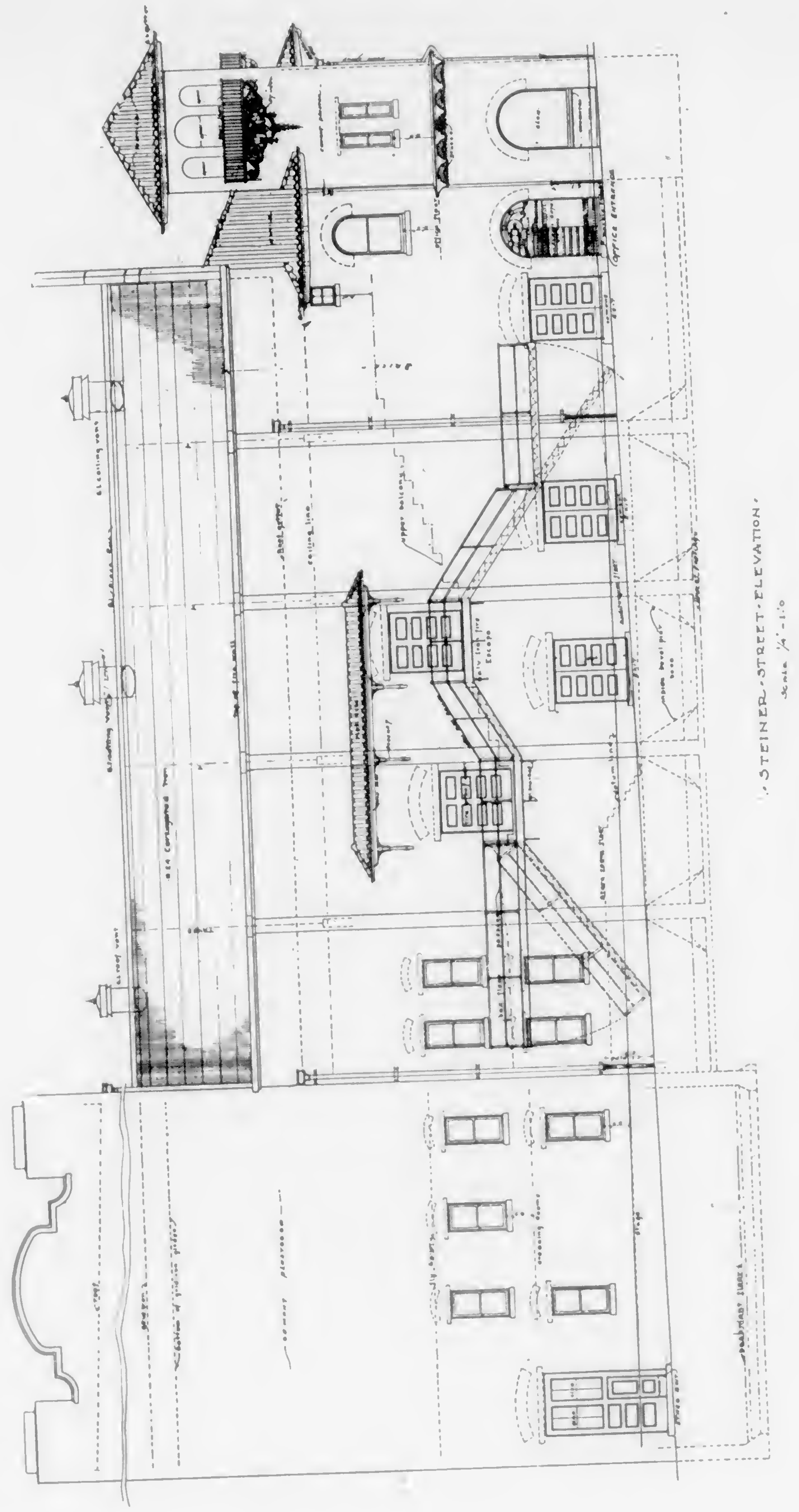
The stage floor is of fire-proof construction excepting a space the width of the proscenium opening from the footlights to the rear wall, which will be of wood. This is the only floor in the building that is non-fire-proof, and is permitted under the building ordinance to be so. The floor is to be almost entirely made up of trap doors. The stage is ninety-four feet long and thirty-five feet deep. There are two stories of dressing rooms at each end. The fly galleries, forming the ceiling for the upper story of dressing rooms, are connected by a paint bridge located five feet from the rear wall. Twenty-five feet above the fly galleries there is a metal gridiron, on which are located the blocks for raising and lowering the various curtains, flies and other paraphernalia used on the stage.

The stage roof is of reinforced concrete on steel beams and covered with asphaltum and is ventilated by two thirty-six-inch galvanized iron ventilators ten feet high and with counter-balanced flat tops to ventilate stage, also two skylights, so arranged that they will slide clear of their curbs upon releasing their fastening, which may be done from the stage floor.

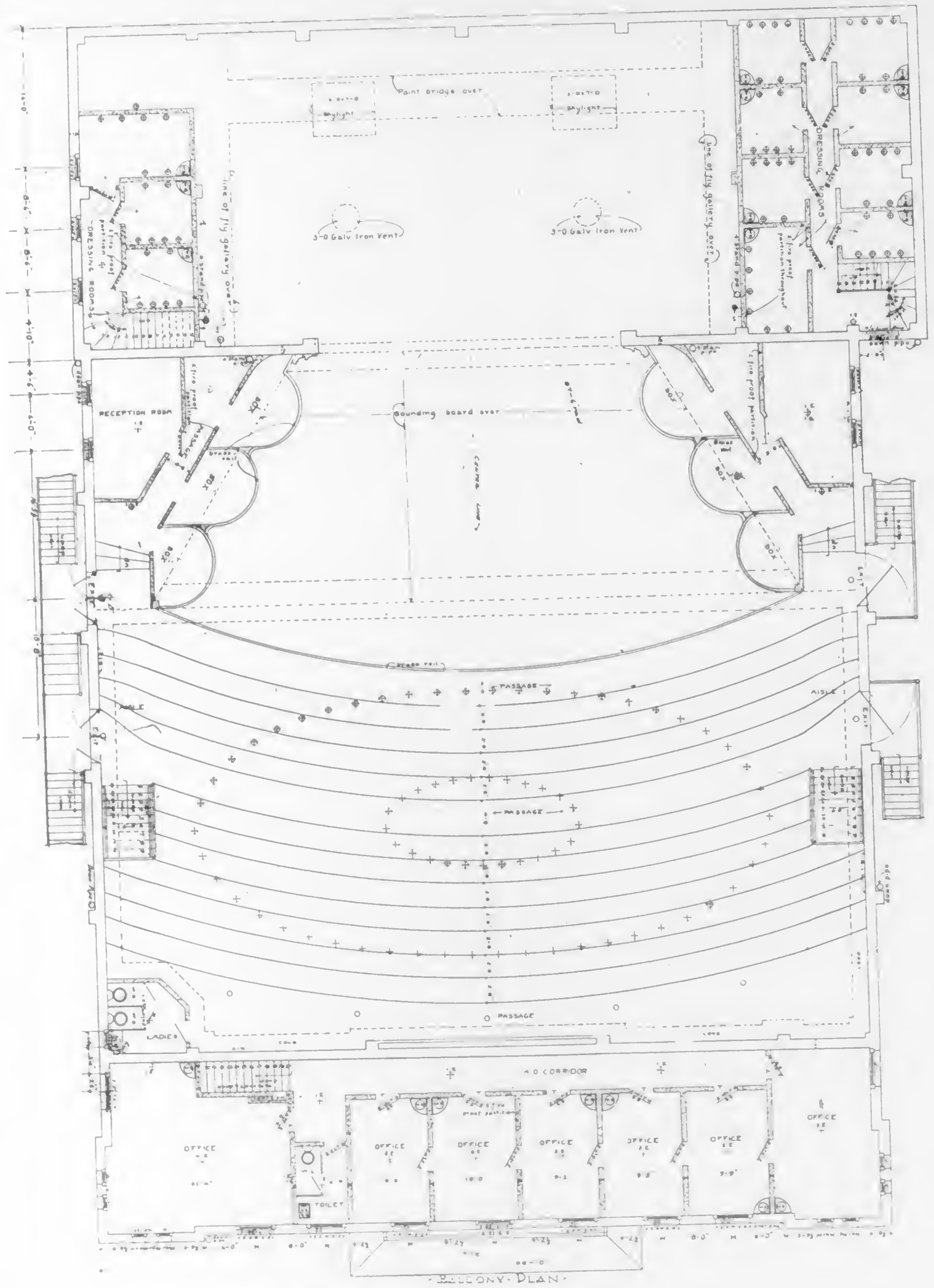
In construction an attempt has been made to follow the letter and spirit of the law and in a number of instances the law has been bettered. There are ten six-foot exits from the sides of the auditorium and the main entrance has twenty-two feet of clear opening. All stairs throughout the building are of iron. The walls are of brick supported upon a rigid steel



Longitudinal Section Alcazar Theatre, San Francisco
Chas. F. Archer and Harley G. Corwin, Engineers



Steiner Street Elevation Alcazar Theatre, San Francisco
Chas. F. Archer and Harley G. Corwin, Engineers



Balcony Plan for Alcazar Theatre, San Francisco
Charles F. Archer and Harley G. Corwin, Engineers

frame and will be plastered with cement plaster outside and plastered upon a damp-proof coating inside.

The roof over the front portion is of reinforced concrete covered with tile, while the roof of the auditorium is of corrugated galvanized iron, supported upon steel purlins carried by four trusses eighty-eight feet in span. The ceiling of the auditorium is plastered on metal lath and in order to deaden the sound of rain falling upon the roof, a false ceiling of plaster on metal lath has been designed to go midway between the roof and main ceiling.

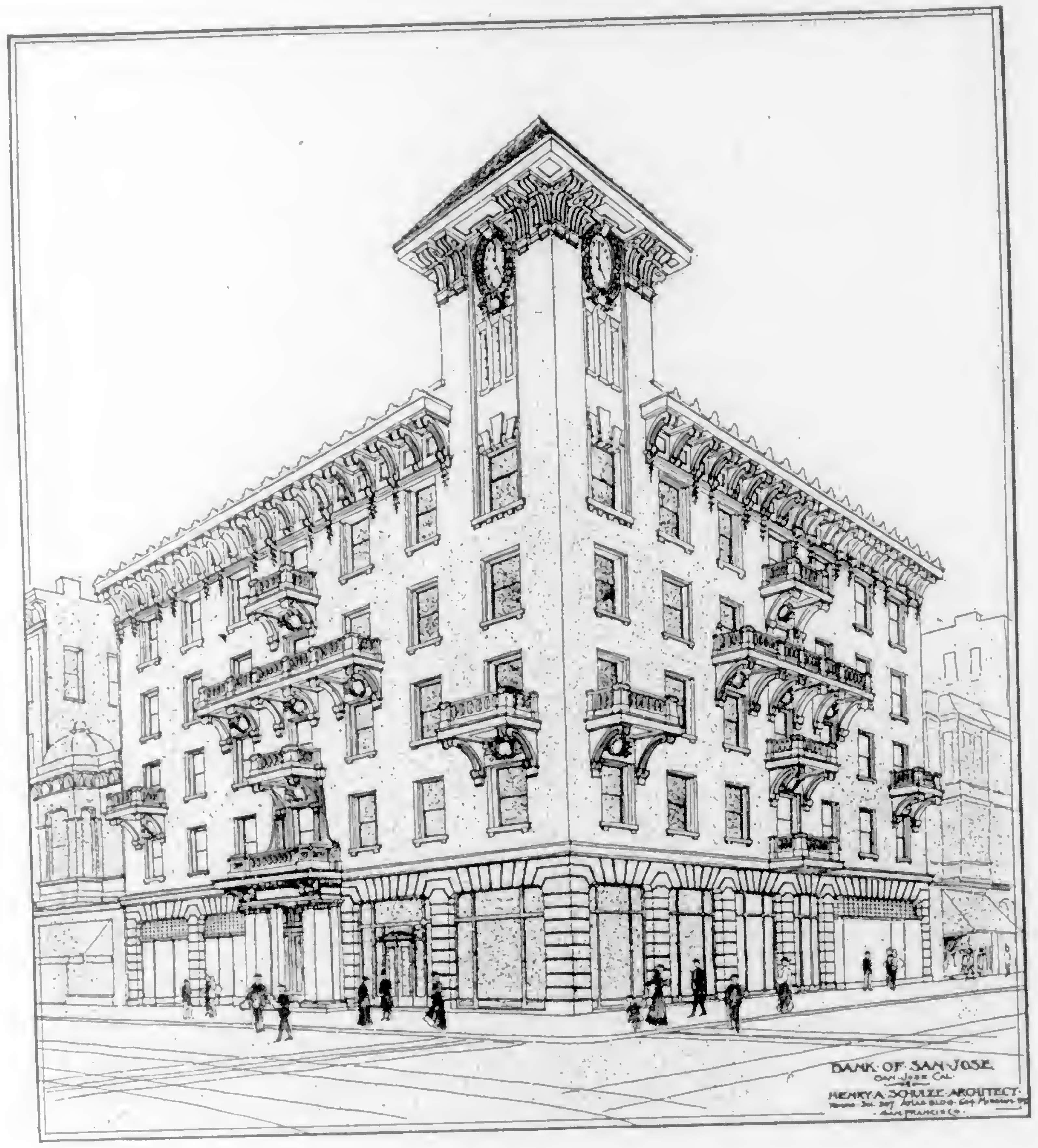
In designing the structural work for this building the architects were bothered to no little extent by some of the provisions of the new building ordinances, notable among which is the provision that the metal of columns shall be at least eight inches from the outside of party line or court walls, while permitting four inches for front walls. To the writer this seems absurd, for the same section permits the metal of girders or wall beams to be two inches from the same lines, and in order that one may use thirteen-inch curtain walls it is necessary to place eccentric loads upon columns. The provision requiring an eight-foot passageway on each side of a theatre of this capacity and at the same time permitting obstructions at the end of the passage amounting to three feet, does not seem, to say the least, consistent.

* * *

Make Fireproofing Materials Bear Building Stress

THE utilization of fireproof brick, terra cotta blocks and tile until recently in building has been confined almost exclusively for the protection of steel frames, partitions and ceilings. Modern building engineers are now making use of fireproof brick and tile not only for the protection given the steel structure, but are using them entirely for the construction of domes, stairways and arched ceilings and their function has been extended to the bearing of the stress of heavy loads. In a number of the lately designed buildings the main walls are built in the usual way of steel columns and girders to carry the load, protected on all sides by terra cotta semiporous and porous blocks, but the dome on the top floor of each structure is made with fireproof tiles. A double line of steel columns divide the domes in two sections, and from the top of these an arched ceiling effect is made of tiles. The span between the columns is sometimes upward of fifty feet, but so perfect is the arch made that the compression is uniformly distributed, and no part of the load is in danger of falling. The tiles used for this domic ceiling are 6 by 15 inches in size, and they are laid on edge so that the flat surface is exposed. The first few courses above the supporting steel pillars are made of fireproof brick, and then the tiles spring from this masonry work and gradually curve inward to the skylight of the dome. The tiles are laid in cement mortar.

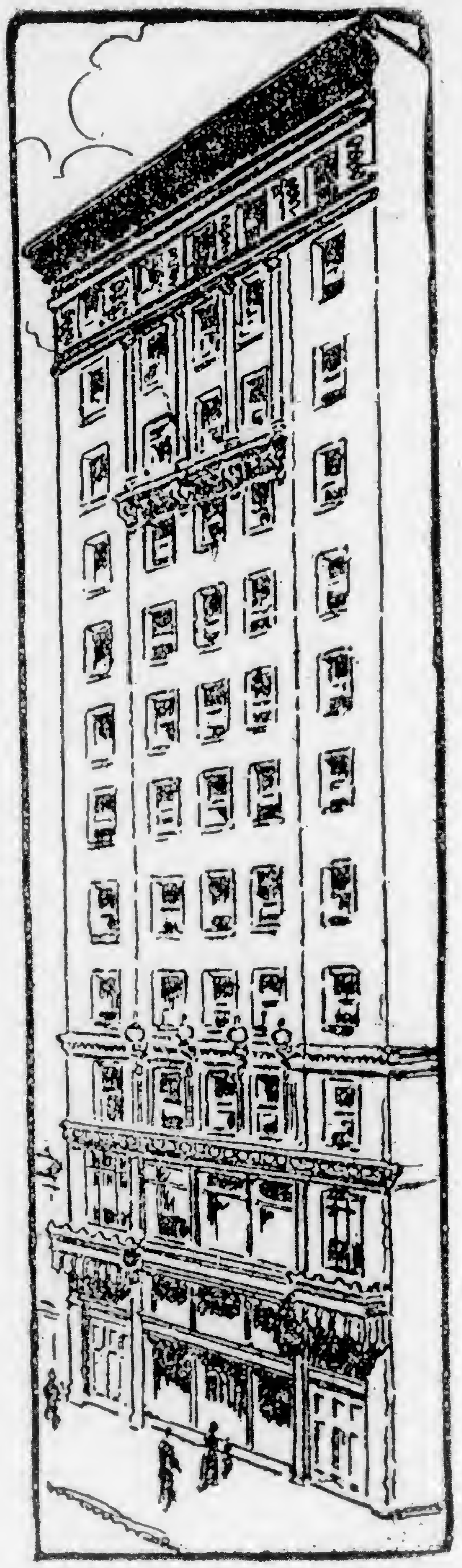
Such a domic ceiling gives the maximum of lighting space at a minimum of weight and cost. The fire protection is considered by architects and engineers unusually safe. In the event of a fire the glass skylight could be broken through, but no other damage would result. The upper loft is completely incased in terra cotta tile burnt in the making to a temperature approaching 2500 degrees. There is no metal framework supporting the dome, and as a result no temperature below 2500 degrees could affect the stability of the arched ceiling.



Bank of San Jose of Reinforced Concrete
Henry A. Schulze, Architect

The New Building Law of San Francisco

*By W. J. CUTHBERTSON, Architect



Rough Sketch of New Magee Building
Bliss & Faville, Architects

GENERAL affairs having now returned somewhat into their normal channels and the days of temporary structures supposed to be relegated to the past, a few words regarding the new building law may not be amiss.

In considering it here, it is not the aim to criticize its minor points, but to consider broadly its provisions from an after-the-earthquake standpoint.

And before we enter into the subject let us state that from a commonplace standpoint the production does credit to its framers; especially considering the time allowed, the many conflicting interests to be placated and the general unsettled state of affairs.

It is a disappointment, however, to anyone who expected a document worthy of the occasion, and who naturally supposed that an event such as we have lately experienced—an event the like of which in the amount of destruction of wealth by natural means has never before been experienced in the world's history—would call forth more than a commonplace document, and one in keeping with our responsibilities under such circumstances.

This being not so, it becomes necessary to point out wherein it fails to fill the bill, and how it may be amended to satisfy, to some extent, the conditions under which we are now.

We shall take it as an axiom that a municipal building law is a law whose sole aim is to protect life and limb by calling for such an arrangement and construction of buildings that will be safe under all conditions so far experienced by man. What else can be its reason of being? This axiom being granted, any other aim cannot be entertained, nor must any of its provisions be for any other purpose.

In looking through the new building law it is evident it does not rise to the occasion. One fails to find in it any evidence of appreciation of the change wrought by our late catastrophe.

That fact seems totally ignored; for beyond the elaboration of some technicalities, the allowance of reinforced concrete (a matter which has been under consideration for some years) and the re-classification of the several styles of buildings, no changes of importance have been made in the law. The changes made are changes which ought to have been made in the ordinary course of events, and are not the outcome of any extraordinary occurrence.

---

*Mr. Cuthbertson was formerly City Architect. His office is at No. 1231 O'Farrell Street, San Francisco.

It is not possible here to give the subject the proper scientific and systematic treatment it deserves, and we shall content ourselves by simply reviewing its salient and most important features, and shall not enter into the non-essential and extraneous parts of the law, such as the schedule of fees—whose unscientific and unmethodical arrangement caps the climax—the boundaries of fire and other limits, etc.

Taking up the subjects as we come upon them in the law itself, we shall consider first—the Limits.

In the law we find several limits: the "Fire Limits," "Mill Construction Limits," "Fireproof Roofing Limits," "Height Limits"; but we find no "Earthquake Limits."

After the experience we have lately gone through the non-recognition of these limits seems a capital omission.

As is well known, the made ground districts of San Francisco (which may be called its earthquake limits) were the districts where practically all the destruction of life and property occurred.

It appears, therefore, that the first amendment necessary is one describing the made ground districts of the city, and enacting that any building therein more than one story high shall have foundations going down to bed-rock, or shall have some other construction by which shocks communicated to this made ground shall be made innocuous. And that this shall not only apply to buildings, but also to all engineering works, such as water and gas mains, sewers, etc.

Anyone that can object to this amendment after seeing the direful results of allowing buildings to be placed on such ground without precautions must be wanting in all feelings of humanity; and I believe the sentiments of all worthy citizens are in accordance with such an amendment.

The statement we often hear that another earthquake of the late one's severity will not happen again for another fifty years, and therefore the present generation will be immune, and has no obligation to provide for the welfare of future generations, should have no weight, as its premises are faulty and it is founded on inhumanity and selfishness.

BUILDING HEIGHTS

The second matter that presents itself is the limit of height of the several classes of buildings.

This we will look at from two aspects: (1), as to the heights allowable in connection with the arrangement and strength of material to protect the public safety from the effects of earthquakes; and (2), the same from the effects of fire.

From the first aspect Class A—the steel frame building—has been found all right as far as it has been tested. These buildings in San Francisco are, however, as far as I know, all built upon the natural soil.

How they would act if the whole or part of the ground under and around them should sink five feet, as happened in filled-in districts, is yet to be seen, and it would be wise to provide against any such contingency.

Class B—Buildings of this class that have a frame of steel or reinforced concrete, carrying both floor loads and walls, are possibly unobjectionable; but those buildings of this class that have "walls supporting adjacent floor loads," or that have walls "self-supporting only, the floors being carried by steel or reinforced concrete wall columns," are not earthquake proof, and should never be allowed to be built as high as 102 feet.

Many deaths were due to such walls being pushed out and over by joists or roof timbers. Eighty-four feet should be the utmost limit for such construction, and no walls should be allowed above the ceiling joists of top floor.

Class C buildings are constructed in the same manner as the next above-mentioned, and therefore the same strictures apply.

Wood frame buildings, when properly braced and well founded, stand the shock of earthquakes as well as steel or any other framed structures. Provisions should, however, be made for reinforced foundations and special provisions for made ground districts.

We will now look at these classes from the second aspect—that of fire destruction.

Class A buildings, although rated as fire proof, are not so while their contents are of combustible materials; therefore a height limit to Class A structures is required.

A height equal to the width of the street upon which any building abuts has been adopted by the majority of civilized cities of the world, and why should not San Francisco adopt the same rule? A city which is liable to destructive phenomena which the before-mentioned cities are not, surely should *a fortiori* adopt a rule at least as stringent. Such a rule would read something like this:

"All buildings must not exceed a height included within a line at forty-five degrees to the horizontal, commencing at the level of the street on the street line opposite to that upon which they are built."

Outside of this the necessity of fire barriers has been admitted. To form these without expense to the city an addition is required to the law—providing that on certain designated streets a space on each side, say of twenty-five feet, should not be occupied by any structure, say over eighteen feet high; the same to be fireproof. Thus will be formed a capital fire barrier, as the tall buildings will be kept farther apart and they may be run up to a greater height than if they were directly on the street line.

Van Ness avenue, Market street and Dolores street are streets peculiarly adapted for fire barriers. Others will easily suggest themselves.

Again, in regard to fire risks:

Class C buildings of the character described as buildings "with the interior floor loads supported by studded partitions or by wooden . . . . columns and wooden . . . . girders disclose a class of construction of a conspicuously vicious character, both from earthquake and fire points of view, and even when metal lathed, should not be allowed a greater height than fifty-five feet." The limit of height now is eighty-four feet when metal lathed.

As to wooden buildings from a fire aspect: The allowance of a wooden building to be of a greater height than forty-five feet at any part or portion is dangerous.

The law states the forty-five-foot height limit shall be taken "opposite the center of either front" in the case of a corner building.

This needs amendment, for where the grades of the streets slope around both fronts of the lot in the same direction a measurement taken in the center of the high side on steep streets gives an extra height of fifteen or twenty feet when the site is of large area. In such cases the height allowed for a wooden building is altogether too high.

It would be a much better proposition if the law read that a frame building at no point of its bulk should be over forty-five feet above the level of the sidewalk at said sidewalk's nearest point to said point of the building.

Shreve & Co.'s $25,000 Temporary Building
Houghton Sawyer, Architect

Having now considered both horizontal and vertical limits, we will take up:

PARTICULAR FEATURES OF BUILDINGS

The particular features of buildings which cause most deaths from earthquakes are chimneys, gable walls and parapets. This being the case one would expect some notice of these in this connection in a post-earthquake building law. But no.

Therefore it requires amendment in the following directions: No isolated *brick* chimney to be allowed in any building if founded upon the earth. Chimneys in a brick wall not to be continued above same in brickwork.

No un-reinforced walls to be built above the ceiling joists of any building or above the roof plate of same.

Experience has shown that all gable walls, including all walls enclosing a roof are found to be pushed out during a severe earthquake by the rafters.

No parapet walls allowed above the roofplate. These also are bound to fall. For the protection of people on the roof a strong metal railing is sufficient.

There are almost endless details about buildings and streets which the lessons of the earthquake ought to modify, but these I cannot go into. This rough outline of three prominent points should provoke some thought.

Leaving this matter-of-fact discussion, let us look for a moment at the aesthetic side of the question.

Let us compare the wide, airy, sunlit promenade and street as we see it now in Van Ness avenue, with a street lined up on both sides with those hideous monstrosities of New York and Chicago—the so-called skyscrapers, and imagine which is the most joyous, which most suited to the genius and temperament of San Franciscans, and how much enhanced the vista would be without obtrusive gables and cornices and clumsy parapet walls.

What a style of architecture could be evolved from post-earthquake ideas! Clean, simple, chaste, substantial, broad, not attenuated! A proper reflex of its people!

Nature has revenged herself—as she always does—for our destruction of her beauties when we filled up those romantic streams and glens that threaded their way through our city. Let us not be backward in taking her lesson to heart.

The Real California Bungalow. A Glimpse of the "Fernwood's" Porch in the Santa Cruz Mountains
A. W. Smith, Architect

The Real California Bungalow

By A. W. SMITH, Architect

THE California bungalow is of comparatively recent origin. Until a few years ago the misnamed Queen Anne cottage was very much in evidence, while to-day these cottages are distressingly passe, and even our workingmen, when they build a little home, try to imitate the better bungalows.

In a few years the architecture of the Golden State will appear as different and foreign to visitors from the East as the grass-roofed East Indian bungalow or the pagodas of Japan, for in addition to our many bungalows there are springing up many quaint, steep-roofed houses, having a comfortable second story, and these structures are destined to occupy a place in architecture quite as distinct as the bungalow.

The bungalow, as it flourishes in the balmy air of the Pacific Coast, is just now our especial pride. Its essential features are breadth, strength and simple beauty of plainness. It is mostly enclosed with shingles, shakes or rough sawn and wide clapboarding. There is a pleasing absence of "mill work" and other fool ornamentation, and in many cases the entire exterior finish is ordinary rough sawn redwood, which is used just as cut, and nailed in place. It must have a wide projecting roof and always has a spacious porch.

Windows there are in abundance; frequently a single ordinary room will have six four-foot windows in it, but these windows are invariably short, varying from three and one-half feet to four and one-half feet high.

Doors are always made in single pattern, being plain, with wide stiles and rails and one large flat panel.

The illustrations accompanying this article are views of a charming little bungalow home called "Fernwood," and situated at Brookdale, Santa Cruz County. It is the summer retreat of Mr. Frank C. Watson, of Oakland. Tree trunks and limbs were used as far as possible for porch railings and columns, and with natural redwood shingles the whole structure blends harmoniously with the redwood trees and forest vines that surround it.

When the Misses Watson entertain their young lady friends the dining table is set on the spacious porch, and there refreshments are served in the mellow shade of the surrounding trees.

The walls and ceilings of the rooms are not plastered, but are covered with wide rough boards with smooth battens over the cracks, and with a smooth base and corner ceiling mould. The smooth wood is waxed and the rough panels are tinted the same as plastering is tinted, affording a pleasant relief from the monotonous wall paper and plastering so conspicuous in our city dwellings.

Furthermore, these walls don't crack like plaster, you can tack up pictures anywhere or nail bookshelves and mantelpieces and have no fear of injuring woodwork or furniture.

The fireplace is made of terra cotta tile, and is large enough to take small logs. It is made with an immense flue, and when a fire is built you have a blaze that is at once cheerful, cozy and warm. There is no disagreeable smoke, either.

This description has been given because Mr. Watson's bungalow is a typical one, and because its many good features are worthy of reproduction.

We might add, in conclusion, although it has no reference to bungalows, a few words about the little Brookdale community. This diminutive settlement of about twenty homes, all more or less on the bungalow order, was organized as a sort of stock company. The various owners clubbed together, put in a water system from nearby mountain springs, a sewer system and an electric light plant, connecting with the wires of the nearest power company, so that the Brookdaler has all the conveniences of his city-caged friends, in addition to the comfort of a real, delightfully romantic bungalow.

* * *

Obliging Motorist (to groom in difficulties with horses)—"Shall I stop the engine?" Groom—"Never mind that, sir. But if you gents wouldn't mind just gettin' out and 'idin' behind the car for a minute—the 'orses think it's a menagery comin'."—Punch.

* * *

Ranter—"But, sir, a genius is a genius, whether he's rich or poor. There is no difference." Wise—"Pardon me, there is a slight difference. A rich genius can afford to let his hair grow long; a poor genius can't afford to get it cut."—Philadelphia Press.

* * *

Upper-Ten Child—"My papa is abroad. Is yours?" Lower-Ten Child—"Yep. Mine is at large ag'in."—New York Weekly.

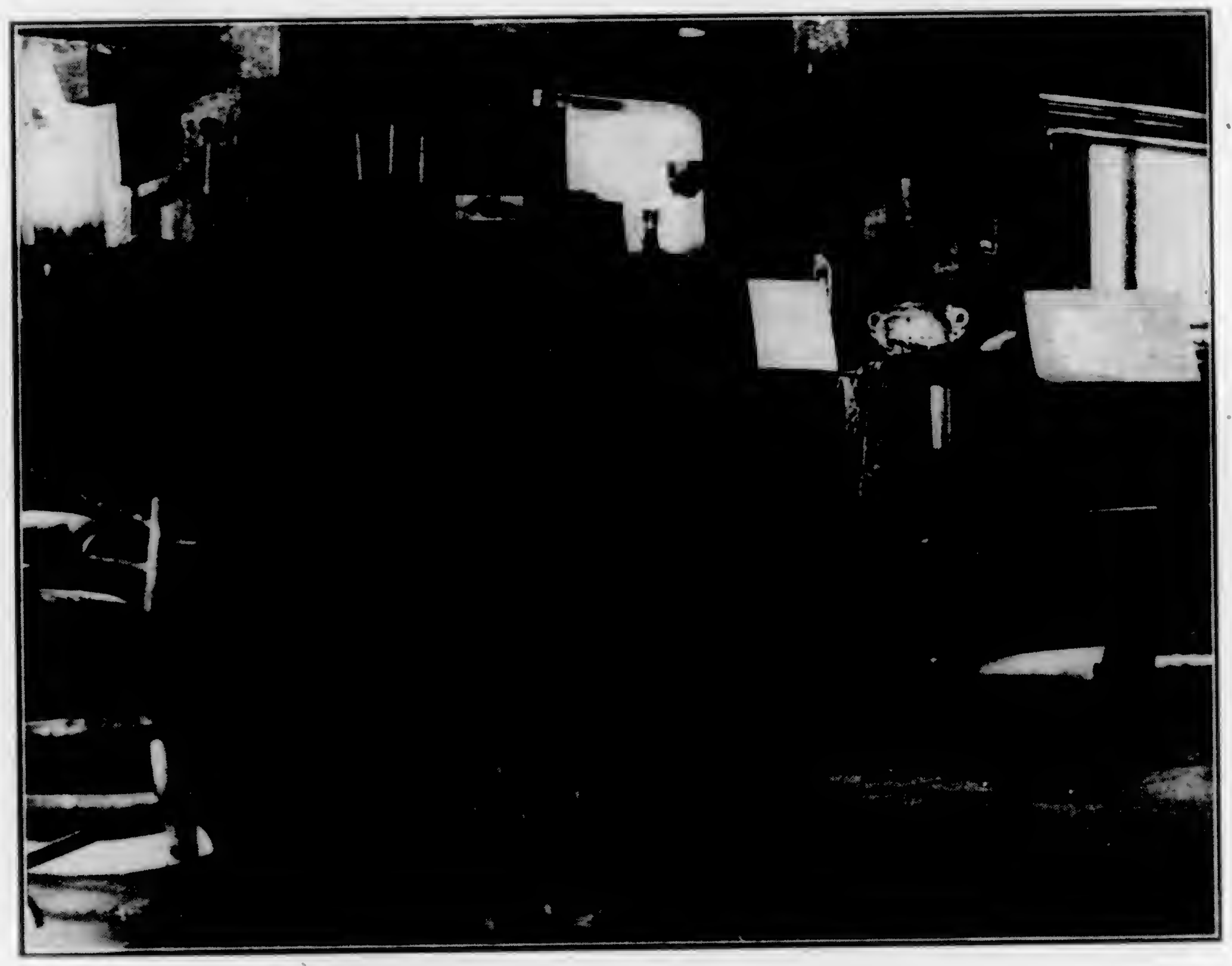
* * *

"Lady Customer (in baker's shop, to shop girl)—"Are these buns today's, because what I bought yesterday weren't."—Punch.

* * *

"Why, Willie, what are you crying about?" "'Cause I don't get no Saturday holiday like the other children does. Boo-hoo!" "But why don't you get out of school on Saturday?" "'Cause I ain't old enough to go to school yet. Boo-hoo hoo!"—Cleveland Leader.

The Real California Bungalow. A Living Room Corner
A. W. Smith, Architect



The Real California Bungalow. The Fireplace
A. W. Smith, Architect

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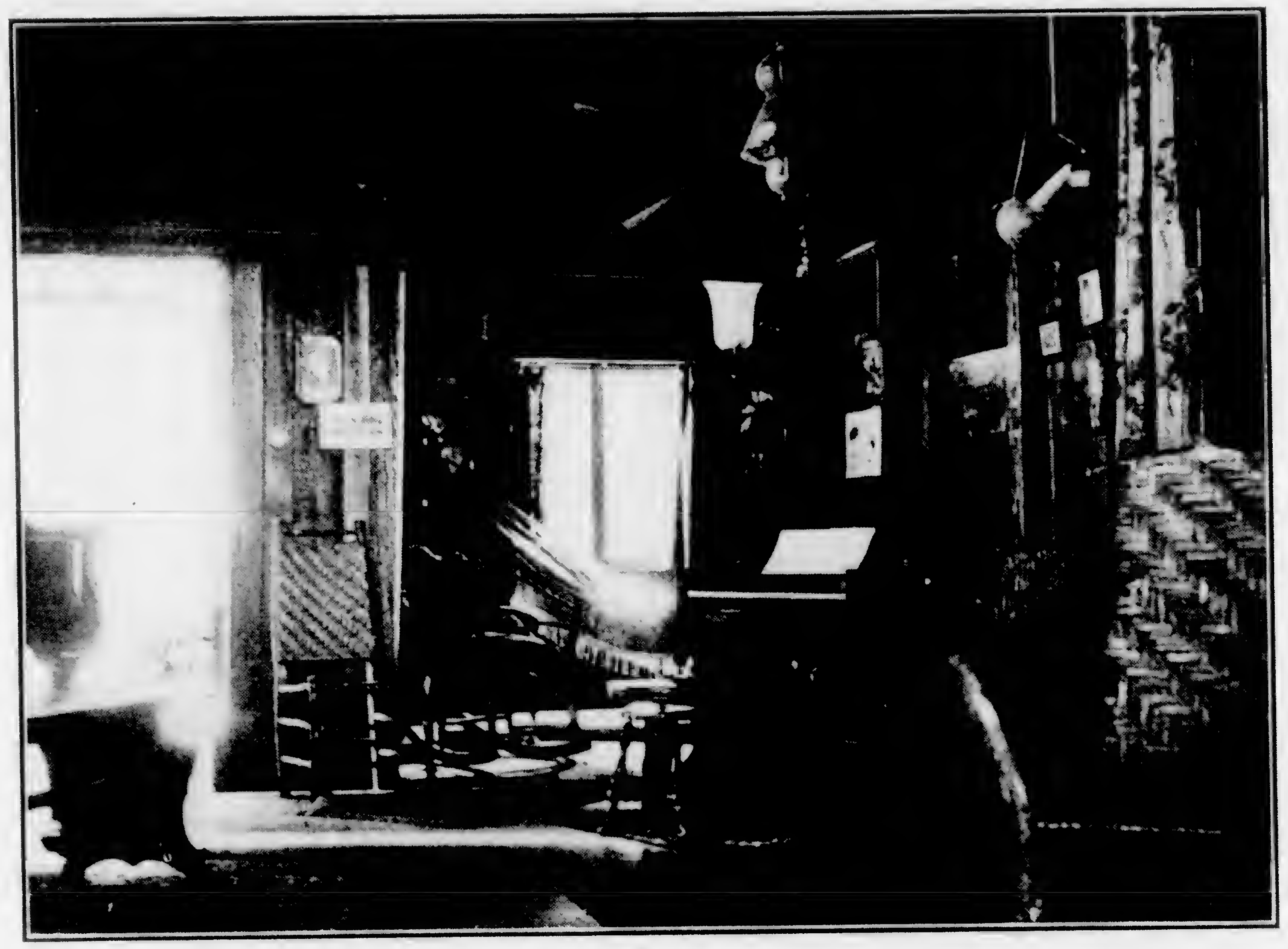


The Real California Bungalow. A Living Room Corner
A. W. Smith, Architect

The Real California Bungalow. The Fireplace
A. W. Smith, Architect

The Real California Bungalow. A Picturesque Lounging Place
A. W. Smith, Architect

More Thuds from the Padded Cell

What was it made Chicago Ill?
'Twas Washington, D. C.?
She would Tacoma Wash, in spite
Of a Baltimore Md.

When Hartford and New Haven Conn,
What reuben do they soak?
Could Noah build a Little Rock Ark
If he had no Guthrie Ok?

We call Minneapolis Minn.
Why not Annapolis Ann?
If you can't tell the reason why,
I'll bet Topeka Kan.

But now you speak of ladies, what
A Butte Montana is.
If I could borrow Memphis' Tenn,
I'd treat that Jackson Miss.

Would Denver Colo cop because
Ottumwa Ia dore,
And, though my Portland Me doth love
I threw my Portland Ore?
—Maurice Smiley, in Lippincott's.

Architectural versus Engineering Requirements

By HENRY A. SCHULZE

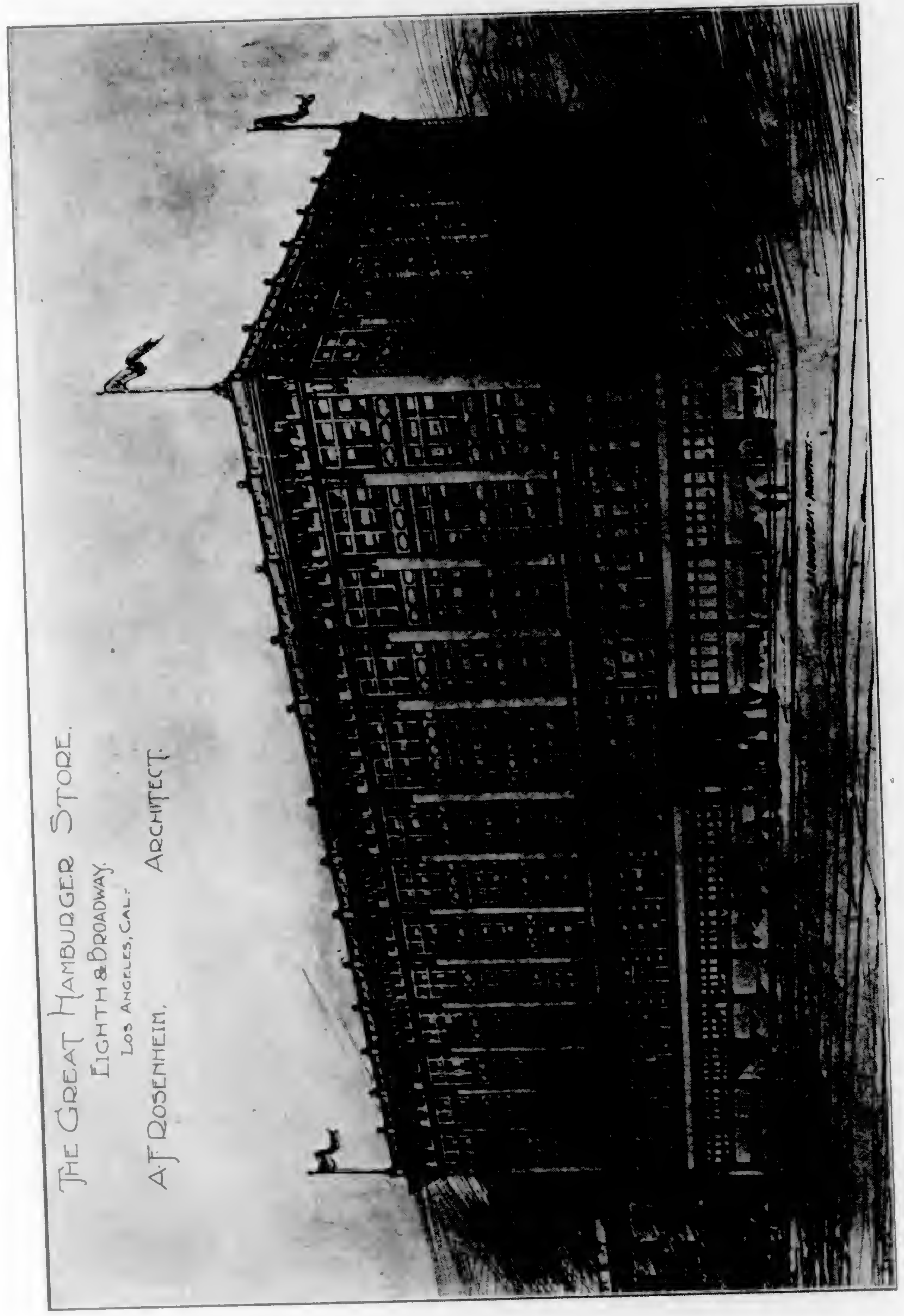
President San Francisco Chapter, American Institute of Architects

THE wording of the above title prompts the query: "Am I to present in a general way the various problems that should confront the architect in his practice in the designing and construction of buildings on the one hand as against the practice of the civil engineer in his vocation of designing and constructing bridges, waterworks, dams, railroads, and many et ceteras on the other—or shall I consider the subject as applying to structures intended for the housing and covering of people and their belongings?" The latter being on more familiar lines and in a sense combining the two elements though worded in opposition shall be the burden of my theme. In this, however, I am handicapped to the extent that I am unable to discover or determine where, in the phase I have chosen, the one begins and the other terminates, where the word "versus" does become a living and energetic actuality. To my thinking it has no right nor the shadow of claim in its present connection. At what period of time in the history of humanity was the parting of the ways? I have failed to find it.

The same conditions and requirements that governed earliest man in his first rude attempts to surround himself with a shield against all foes were then as today the same; the grand and glorious development of this first idea has not changed fundamentally one whit in its later concrete expression as manifested in a Florentine Duomo or an Eiffel Tower. If a seeming division has taken place, it is not real and is marked only by the sloth, indifference or incapacity on the part of a portion of one profession and the active zealousness of the other. If ease of participation in the activities of one profession until a problem of magnitude is presented justifies the title of this paper, then a note of warning must be sounded alike to both professions.

The architectural profession in this State long since was keenly alive to this and was actively interested in recent years in a legislative enactment governing and regulating the practice of architecture in California which requires that an architect, to legally practice architecture, must be certificated by the State, previously demonstrating his ability and honorable claim to a clear title by an examination. Many have failed to acquire this distinction but continue to ply their business with the support of a portion of the building public by the assumption of the title of "Architectural Engineer," hoping thus to avoid the punishment and penalty that must and will inevitably follow. If this condition justifies the title of this paper "Architectural versus Engineering Problems," it would seem indeterminate whether the architectural profession is most to be congratulated upon its loss or the engineering profession most to be commiserated upon this acquisition, in that in one profession this nondescript could not be entrusted with the construction of a chicken coop without the certainty of collapse while under the new title he is often credited with the honorable distinction of the erection of a sky-scraping office building.

If there has been a parting of the ways and therefore a legitimate reason for considering "Architectural versus Engineering Problems" and architecture is separated into a fine art and a mechanic art, then "alack the day," the grand profession of architecture has degenerated into the art of the draftsman and decorator, and it behooves the noble profession of civil engineering to acquaint itself with those subtle qualities of mind governing the highest refinement of mass and proportion and the estheticism of legitimate ornament as applied to structural necessities.


THE GREAT HAMBURGER STORE.
EIGHTH & BROADWAY.
LOS ANGELES, CAL.
A.F. ROSENHEIM. ARCHITECT.

The Hamburger Building, Los Angeles
A. F. Rosenheim, Architect

A Mammoth Department Store

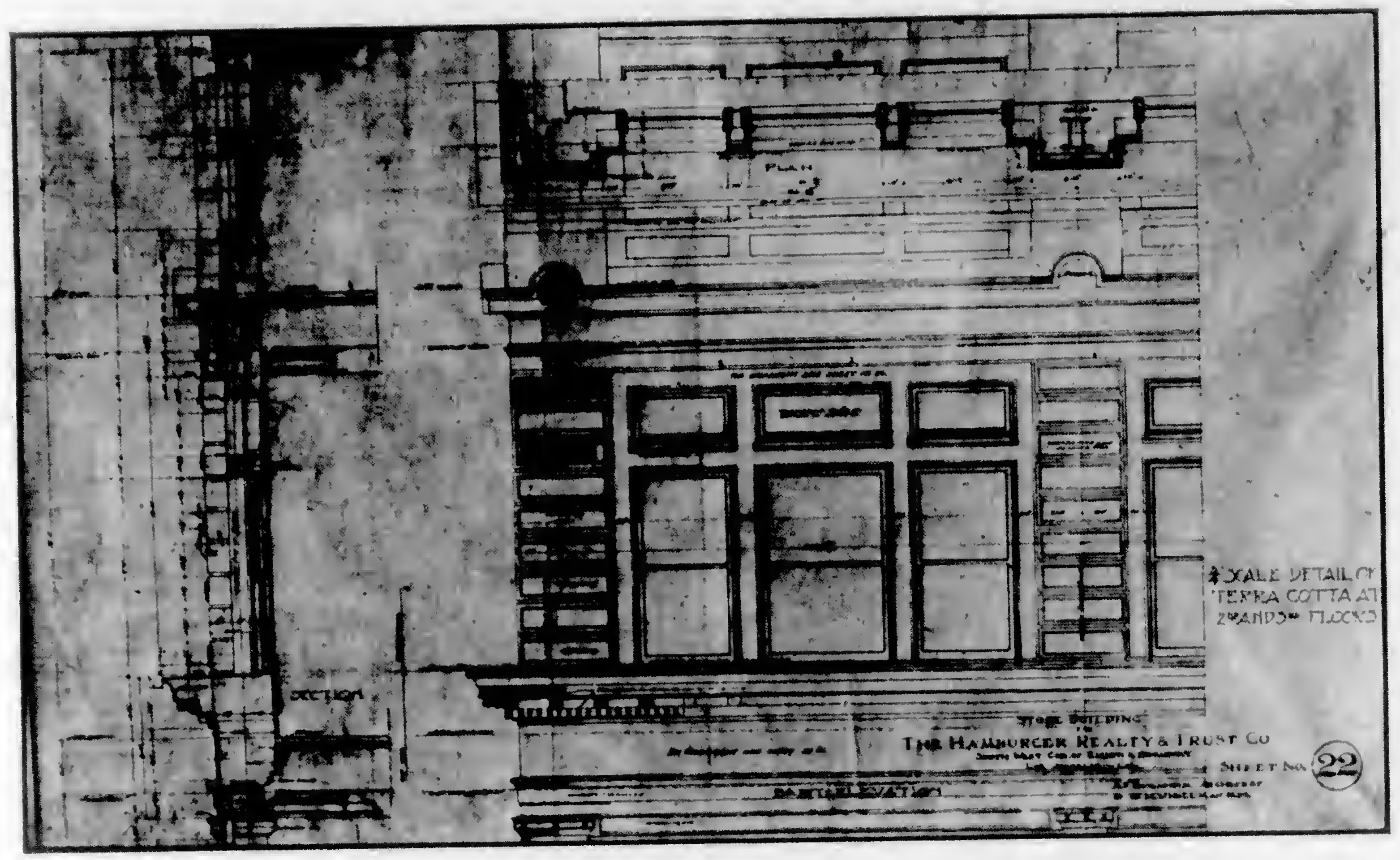
By A. F. ROSENHEIM, Architect

WITH the letting of the contract for the structural steel and front a few days ago began the construction of what will be one of the largest buildings, devoted exclusively to retail business, west of the city of Chicago. In the great "Hamburger Department Store" there will be no less than 5500 tons of steel required for the skeleton frame. This means 11,000,000 pounds of material, costing about $450,000. To convey an adequate idea of the magnitude of the building, one has but to know that this is a larger tonnage of steel than was used in the Fairmont Hotel at San Francisco and the Merchants' Exchange in the same city, together. It is more than 1000 tons in excess of the steel that was used in the Huntington Building in Los Angeles and about five times as much as will be used in the construction of the Tehama Building at the northwest corner of Seventh and Broadway, in the same city.

It is the intention of the Hamburgers to make their building a model of its kind, and with this in view they have recently made a tour over the country with their architect for the purpose of inspecting the best department stores in seventeen of the most important cities. Their building will embody the latest ideas and improvements designed to facilitate and expedite the work of handling the business.

The site, at the southwest corner of Eighth and Broadway, has a frontage of 300 feet on Broadway, 161 feet on Eighth street, with a wing or extension running through 161 feet to Hill street, and with a frontage of 124 feet on that thoroughfare, thus covering a ground space or area of 70,000 square feet. This is 10,000 square feet larger than the Huntington Building at Sixth and Main streets, Los Angeles, itself one of the largest structures in the United States. The building will rise five stories and a half above the sidewalk to a height of about 120 feet, with a twelve-foot clear basement over the entire area, and a sub-basement at the Eighth street end, having a clear height of twenty-two feet, providing an area of about 50x170 feet for the light, heat, power and refrigerating plants as well as other machinery that will be required for cooling and cleaning purposes, and the pneumatic tube system, which will be extensive. The stories will be of the following unusual heights: Twenty-three feet for the first, eighteen feet for the second and sixteen feet each for the third, fourth and fifth, while the attic will average eight and a half feet and is designed to contain the piping in connection with the heating, ventilating and plumbing systems.

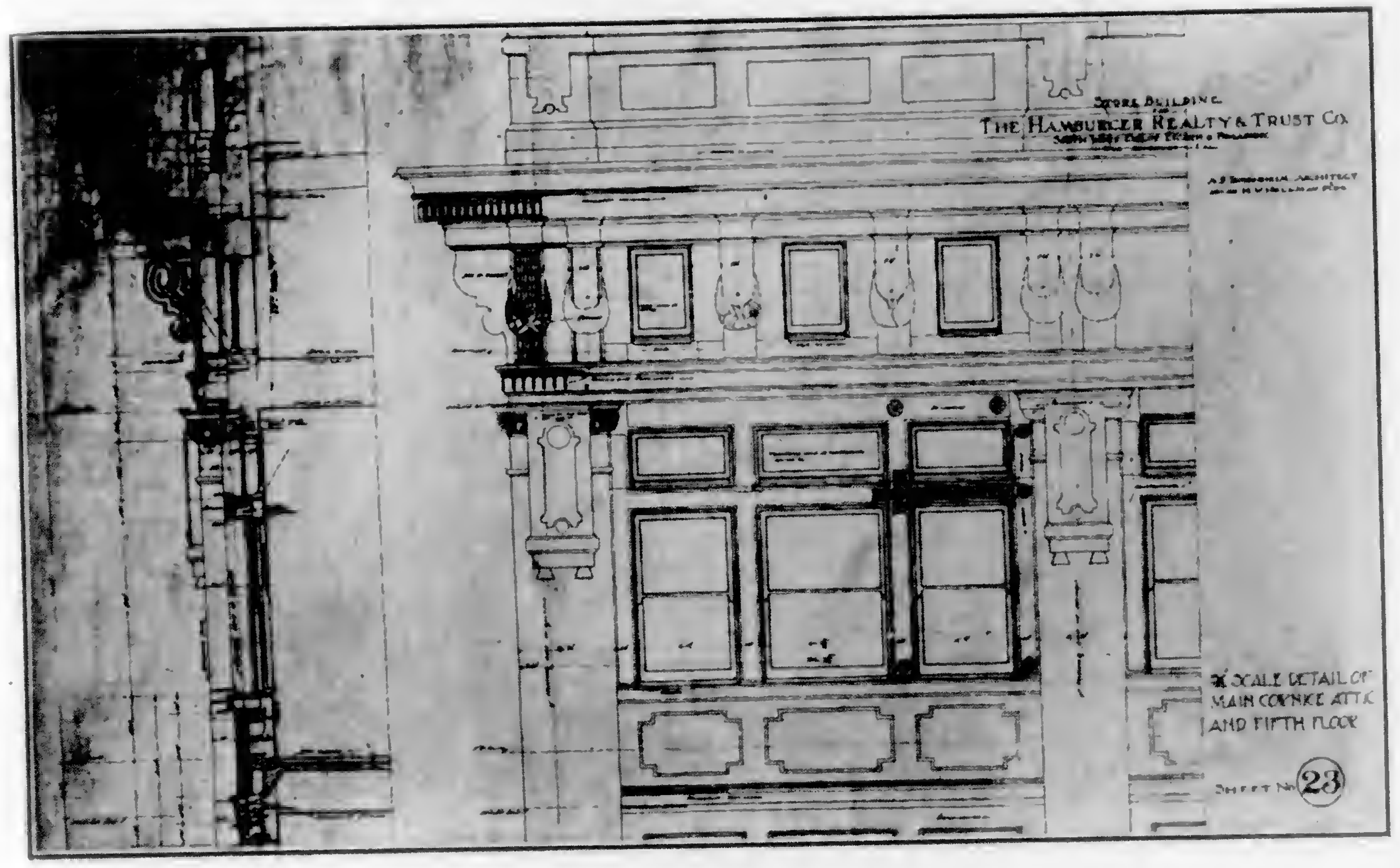
The materials to be used in the exterior are highly ornamented cast iron from sidewalk grades up to and including the second story sill course, from which point to the top of the parapet walls, full-glazed or enameled cream-colored terra cotta, the same treatment being carried throughout the Broadway, Eighth and Hill street fronts, along simple architectural lines. The interior will be finished throughout in selected mahogany. All stairways will be of steel and concrete construction enclosed in fire-proof shafts; likewise the elevators of which there will be ten as follows: Six exclusively for passenger service, with cars of unusual size designed to carry from twenty-five to forty people. Two exclusively for the use of employes and two exclusively for the use of freight, which will be handled directly from the large transfer company's trucks at the south end of the Hill street wing, where they will have ample room to back in under cover. The freight cars will be six feet by twelve feet each. The type of elevators



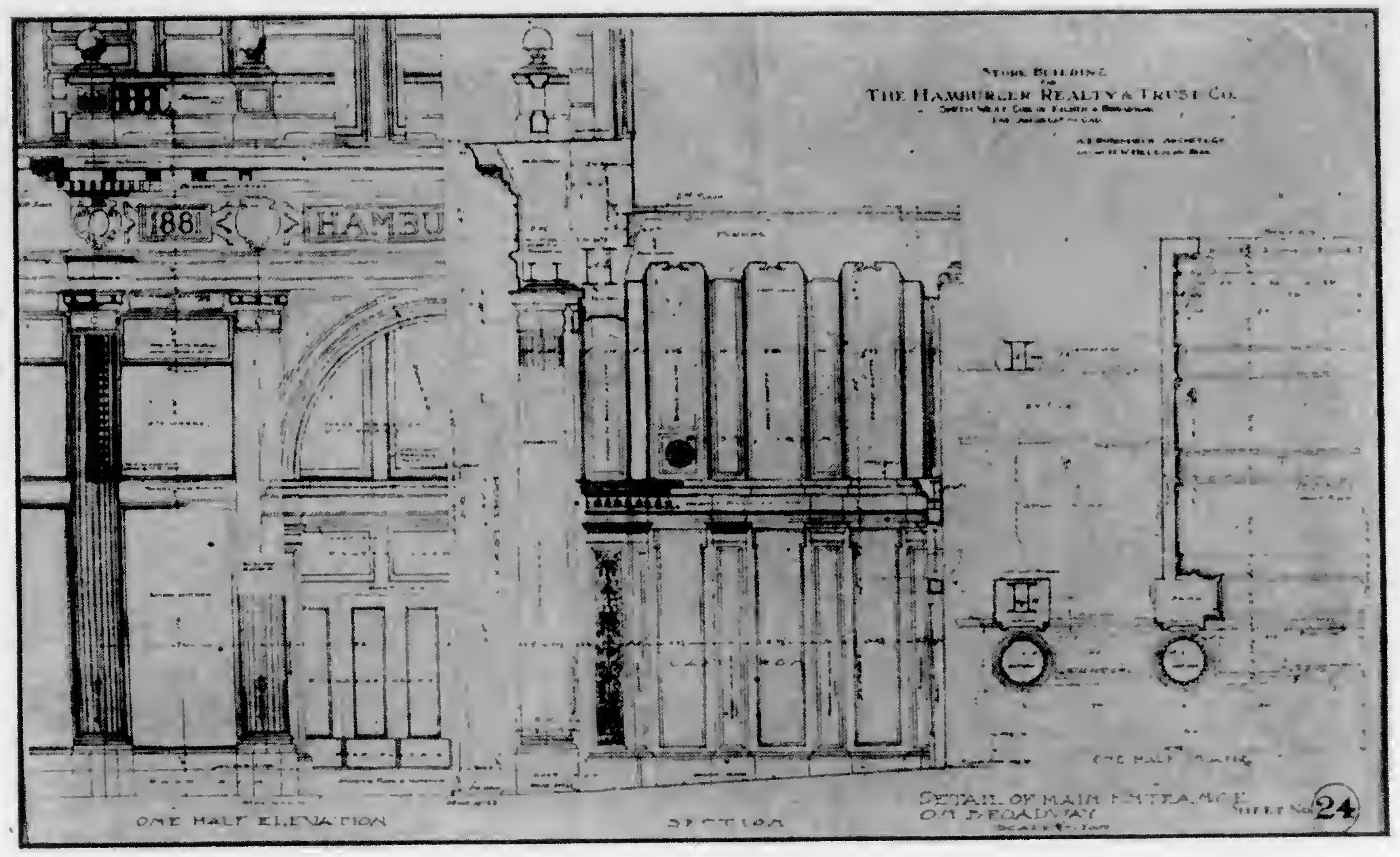
The Hamburger Building, Los Angeles. Terra Cotta Detail
A. F. Rosenheim, Architect

to be installed has not yet been determined, but it is safe to say that they will be of the latest and most approved pattern, equipped with all safety devices known to the leading manufacturers.

In addition to the elevators, it is the intention to install a series of "escalators," or moving stairways, extending from the first to the top floor, and by means of which people can be carried to the upper floors at the rate of 4000 per hour, far exceeding the capacity of all the elevators. There will be a gravity package conveyor connecting with all floors and terminating in the shipping room in the basement of the Hill street wing.



The Hamburger Building, Los Angeles. Cornice Detail
A. F. Rosenheim, Architect



The Hamburger Building, Los Angeles. Detail of Main Entrance
A. F. Rosenheim, Architect

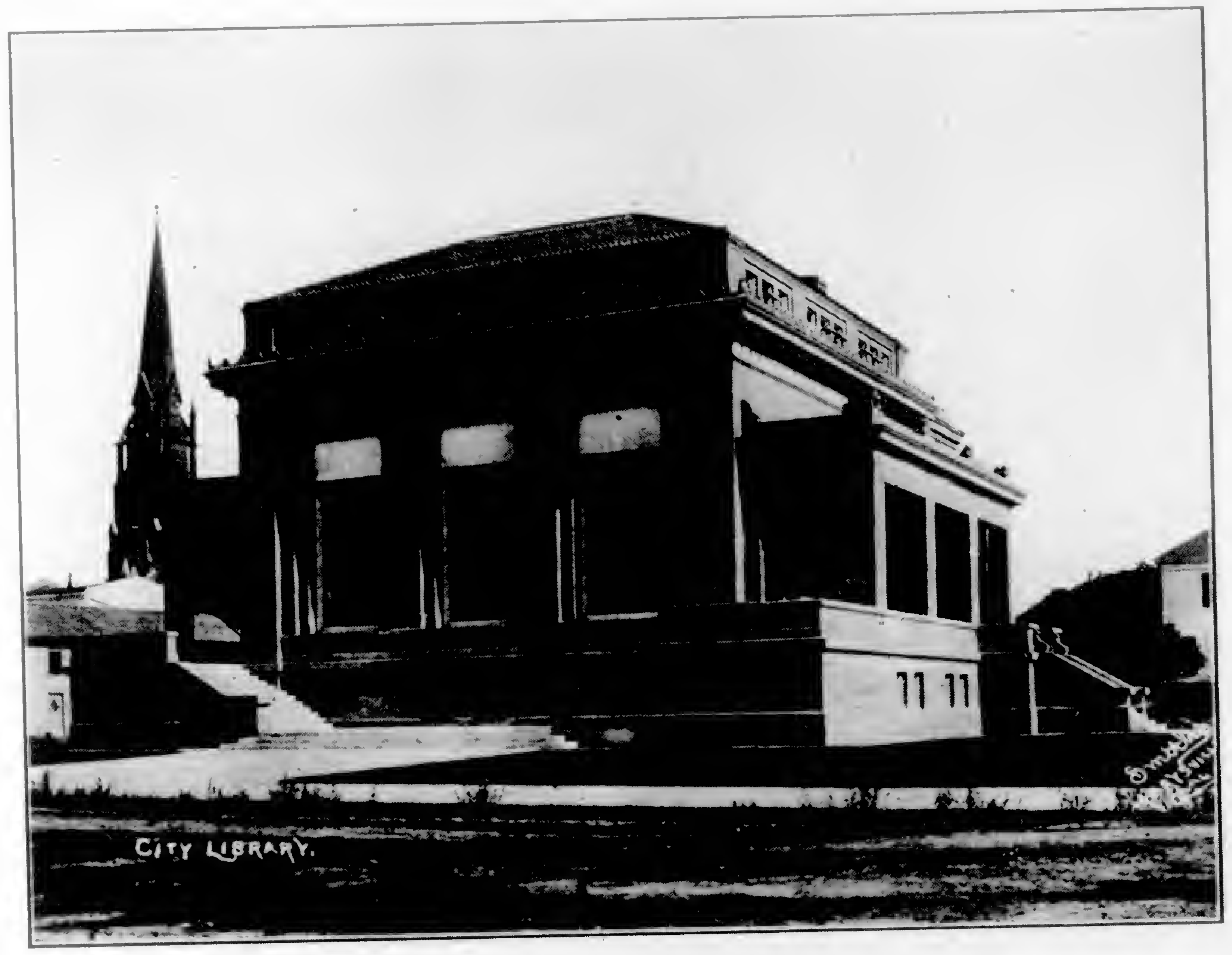
In connection with the shipping department there will be a city delivery for which unusual arrangements have been provided. The wagons will enter directly from the street into the basement by means of an inclined plane located at the north end of the Hill street wing, entrance and exit being effected in the same manner.

Plate glass *only* will be used in the windows throughout and, where openings occur on dividing property lines, they will be furnished with steel frames and sash and obscured wire glass, making them absolutely fire-proof, so far as the external effects of heat are concerned. The doors in the elevator and stair shafts will, in like manner, be provided with wire glass polished so as not to obstruct the view. The floors throughout will be of selected white maple, in narrow strips. Plaster of Keene's cement will be employed and all ceilings will be sub-divided into panels by means of plastered beams running longitudinally and transversely on the lines of the columns, all of which will be circular and finished with an ornamented cap directly under the beams. The steel frame of the building has been designed of sufficient strength to permit of the erection of two or three additional stories at some future time, bringing the height of the building up to the full limit allowed by the city ordinances. The cost of the structure exclusive of the interior, counters, shelving, show cases, lighting fixtures, decorations, etc., will be approximately $1,250,000. The fixtures, themselves, which it is proposed to construct of mahogany, will increase the cost to $1,500,000 in round figures.

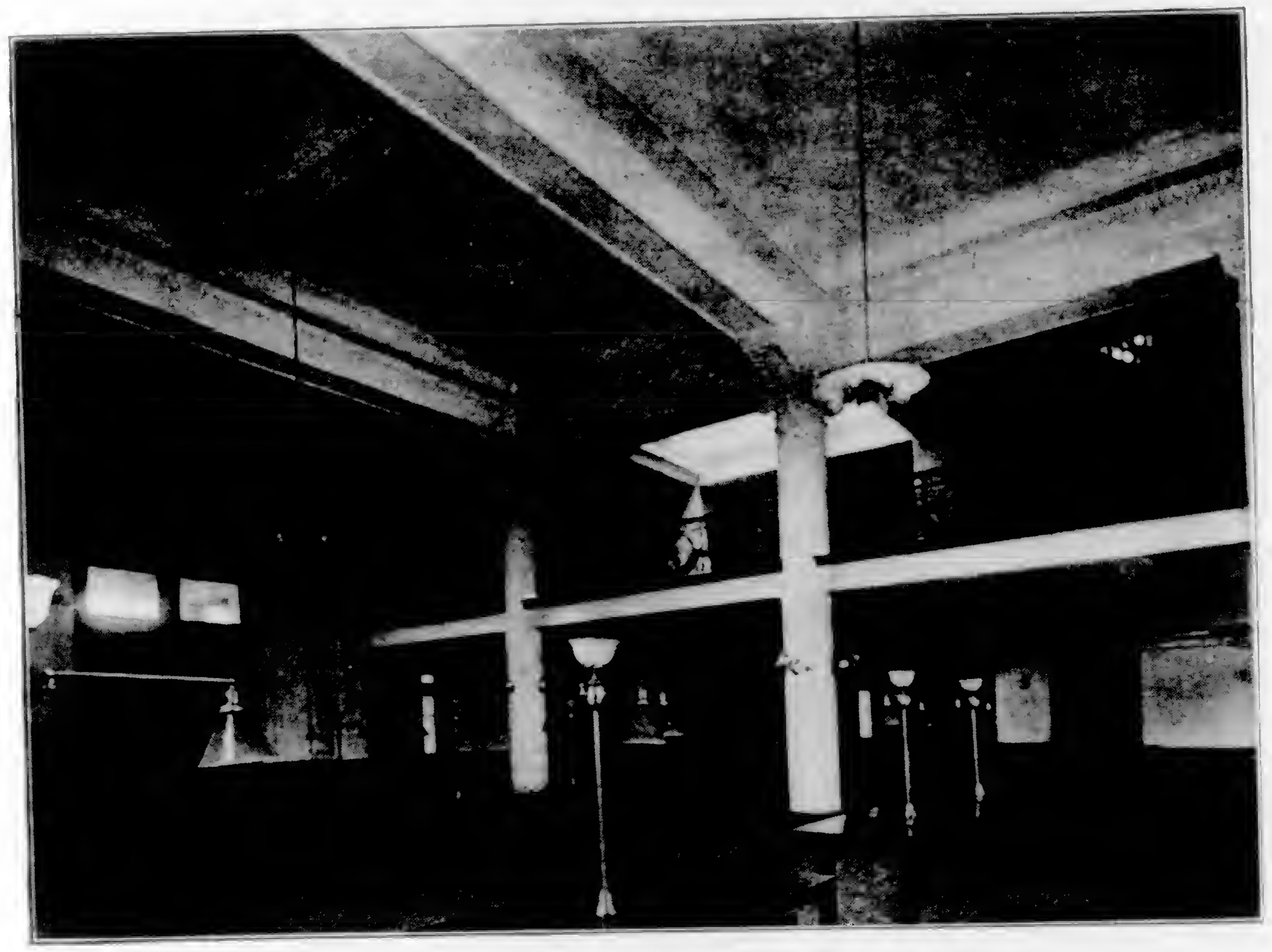
The excavation and foundations of this mammoth structure are under contract to Carl Leonardt. William H. Bryan, of St. Louis, Mo., has been associated with the architect as consulting engineer in the design and construction of the light, heat and power plant.

* * *

"I want to know," said the irate matron, "how much money my husband drew out of this bank last week." "I can't give you that information, ma'am," answered the man in the cage. "You're the paying teller, aren't you?" "Yes, but I'm not the telling payer."—Chicago Tribune.



Marysville Free Library of Reinforced Concrete
William Curlett, Architect. Maurice Couchot, Engineer



Interior of Marysville Free Library
William Curlett, Architect. Maurice Couchot, Engineer

What Neighboring Architects Suggest for the New San Francisco

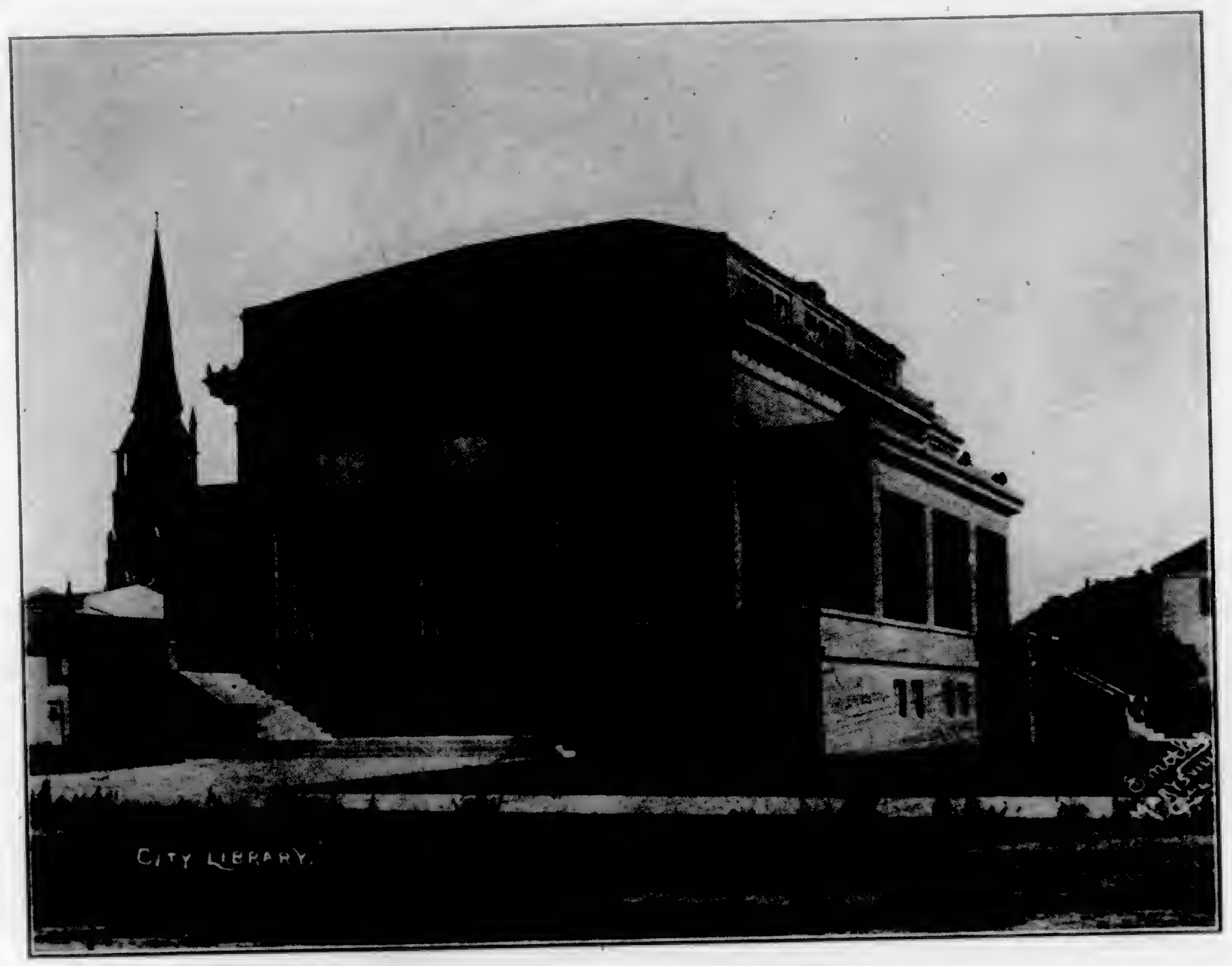
IN a recent issue of The House Beautiful some space is devoted to publishing expressions of various architects of note throughout the country on the rebuilding of San Francisco. These views may appeal to the San Francisco architect and builder as having been worked out by the authors more from a theoretical than practical standpoint. Without commenting on the good or bad points brought out by these learned gentlemen—our Eastern brethren—the Architect and Engineer reprints herewith extracts of the opinions which will be found interesting if nothing more:

Russell Sturgis, of New York, writes: "The important thing in rebuilding a city, as in building a new one, is to design and complete attractive buildings. That is what Chicago and New York, Boston and Baltimore, are without—or so nearly destitute of that exceptions do not count. If you can persuade the owners of property to employ architects of some training and much originality of mind, and if those architects, once employed, will go to the spot, work out their designs, and produce for each house the best that can be thought of under the circumstances, you will provide what San Francisco needs, and what all of the villages and towns of the United States need equally.

"Any attempt to carry out schemes of uniformity of style will be giving the unnecessary, the fanciful, the non-artistic result in the place of the seriously important one. It is like the ornaments—the vases and statuettes—in our sitting rooms: if they are fine in themselves, and especially if they are fine in color, they suit one another marvelously—oriental and modern French, ancient Greek and modern American amateur experimental, all go together in a wonderful way. And if you would remind me that the owner of these gimcracks has of necessity some taste in their arrangement, and that this arranging is just what cannot be done to houses in a street, I remind you in return that the houses in the street have natural foliage to lend its powerful aid in harmonizing them."

Myron Hunt, of Los Angeles, writes: "I had but one residence in the earthquake district, and have just returned from its examination. It is situated on Russian Hill, which is next to the highest point of rock within the city of San Francisco. Owing to the size of the property and to the existence of a large amount of barren rock surface in the immediate neighborhood, this residence and seven others are the only buildings within a radius of more than a mile which were not touched by the fire.

"The residence is that of Mr. Livingston Jenks, formerly of Chicago. It cost approximately $40,000 and was built by day's work. Neither labor, material nor money was spared in the erection of the structural part of the building. It was occupied at the time of the earthquake. The entire rock upon which it stands was swayed to an extent which made it almost impossible for the occupants to get from one room to another. Pictures, statuary and bric-a-brac were thrown about indiscriminately. Nevertheless $25 will repair the damage done. There are three cracks less than one foot long, which appeared in two rooms. The cracks are at the bases of segmental arches, and are no worse than shrinkage of timber might have produced. The chimneys were laid in cement and are entirely intact. The two and one-half story vaulted hall (plastered on framework, the wood-lath reinforced at all angles with one-half-inch mesh chicken-wire before plastering) is entirely without cracks. The plastering is three-coat work, ordinary lime material, tempered with 10 per cent of imported Keen cement.



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"Any attempt to carry out schemes of uniformity of style will be giving the unnecessary, the fanciful, the non-artistic result in the place of the seriously important one. It is like the ornaments—the vases and statuettes—in our sitting rooms: if they are fine in themselves, and especially if they are fine in color, they suit one another marvelously—oriental and modern French, ancient Greek and modern American amateur experimental, all go together in a wonderful way. And if you would remind me that the owner of these gimcracks has of necessity some taste in their arrangement, and that this arranging is just what cannot be done to houses in a street, I remind you in return that the houses in the street have natural foliage to lend its powerful aid in harmonizing them."

Myron Hunt, of Los Angeles, writes: "I had but one residence in the earthquake district, and have just returned from its examination. It is situated on Russian Hill, which is next to the highest point of rock within the city of San Francisco. Owing to the size of the property and to the existence of a large amount of barren rock surface in the immediate neighborhood, this residence and seven others are the only buildings within a radius of more than a mile which were not touched by the fire.

"The residence is that of Mr. Livingston Jenks, formerly of Chicago. It cost approximately $40,000 and was built by day's work. Neither labor, material nor money was spared in the erection of the structural part of the building. It was occupied at the time of the earthquake. The entire rock upon which it stands was swayed to an extent which made it almost impossible for the occupants to get from one room to another. Pictures, statuary and bric-a-brac were thrown about indiscriminately. Nevertheless $25 will repair the damage done. There are three cracks less than one foot long, which appeared in two rooms. The cracks are at the bases of segmental arches, and are no worse than shrinkage of timber might have produced. The chimneys were laid in cement and are entirely intact. The two and one-half story vaulted hall (plastered on framework, the wood-lath reinforced at all angles with one-half-inch mesh chicken-wire before plastering) is entirely without cracks. The plastering is three-coat work, ordinary lime material, tempered with 10 per cent of imported Keen cement.

"My conclusions are that all forms of construction, when thoroughly carried out, will continue to prove safe for San Francisco; that the steel frame or reinforced concrete construction is the most safe, both against loss of life and damage to property, but that in putting up steel frames and reinforced concrete structures, architects will in the future be more strenuous in insisting upon at least one full cross-wall in each direction, made of solid masonry, with the idea of furnishing an interior structural brace against the twisting motion of an earthquake. Such walls undoubtedly saved the veneering on the exterior from being cracked or thrown down by the whipping and twisting motion produced by the earthquake.

"The loss by the earthquake impresses a visitor as being less than he expected, but the loss by the fire is greater than any written description can make an outsider comprehend."

From Donn Barber, New York: "Any investigation of the real effects of the earthquake upon the buildings of San Francisco is difficult, and the results are unsatisfactory. The testimony of eye witnesses is most unreliable, owing to the state of panic and the need of self-preservation which existed at the time. No cool-headed and scientific observation was possible. We shall, therefore, probably be forced to depend upon the silent testimony of the relics of the disaster; and here again we, as architects and engineers, are hampered and obstructed in our researches by the complications due to the subsequent action of fire and dynamite. Even if the effects of this particular earthquake could be clearly read, it would not be safe to conclude that the action of those in the future will be the same, so different are they in their movements of upheaval, sliding or rotation. It would seem, therefore, that we are forced back upon theory to determine what class of buildings will best withstand the shock and the unequal settlement or upheaval of their foundations.

"A few facts, however, seem to stand clear of the mass of uncertainty. The great destruction by fire has once more shown us that the fire-proof building cannot resist the concentrated heat of a surrounding mass of burning buildings. We have advanced sufficiently in the science of fireproof construction to make our buildings safe from any fire which may originate within their walls, but we have not yet reached the point where we can construct buildings which will not succumb to the terrific heat of burning buildings on all sides. This has been demonstrated again and again. It is too much to expect that the entire city, or even any one great section of the new San Francisco, will be of fire-proof construction, but it is to be hoped that the city will, at least, be divided into many sections by lines of fire-proof buildings separating the areas given over to inflammable or slow-burning buildings, each from the others. This would prevent the irresistible sweep of the flames; while the sections in which fires originated might be totally destroyed, the neighboring sections would not be affected.

"The great danger to life in an earthquake is from the falling parts of buildings and, while it is probably not within the bounds of human effort to prevent all loss of life, it is certainly possible to lessen the loss. It would seem, therefore, that the following very general precautions should be taken in the rebuilding of both the residential and the business sections of the city.

"Any system of construction adopted should be sufficiently flexible or elastic to permit the building to adjust itself, within reasonable limits, to an unequal settlement of its foundations and to sliding or vibratory motions of its parts. To this end steel would seem to be the ideal material, for it is possible to construct a building of steel which will withstand almost any strain and adapt itself to all manner of deformation. The steel frame of a building should not be rigid; the columns should be as few and as far apart as possible, so that in the case of unequal settlement the angle of distortion will be less than in shorter spans; and the connections and joints of the columns, beams, etc., should be flexible instead of rigid. All bracing should be curved instead of straight, so as to add to the elasticity of the structure. In other words, the building should be no stiffer than is necessary to withstand the wind pressure. The floor beams should be as close together as possible and should be connected by closely placed tie rods. The floor arches should be reinforced in such a way as to guard against cracking and falling. Steel should everywhere be fire-proofed with cement on wire lath.

"Stairs should be built of wrought iron, steel, or very heavily armored concrete, and should be located if practicable, on an outside wall and as near the exit as possible. Projections of masonry over the street, such as cornices, balconies, etc., should be avoided, and if used at all, should be supported on a steel skeleton securely attached to the frame of the building.

"Water and gas pipes, both interior and exterior should be placed in ample ducts and should be furnished with expansion joints, or loops, to avoid rupture. All exterior pipes and conduits should be kept as far from the columns as possible.

"Walls should be as thin as the structural condition will allow, should be supported at every story on girders or beams, and in every case should be anchored to the framework.

"Reinforced concrete will probably be very largely used, but should be employed with caution because it is in an evolutionary and experimental stage of development. Large monolithic slabs of whatever material used should be avoided on account of the possible cracking and crumbling under great shock.

"In other words, the fire units and the units of construction should both be kept as small as possible."

Wilson Eyre, Philadelphia: "Regarding the rebuilding of the residence portion of San Francisco I would say that beyond the planning of a general big scheme, such as streets, parkways, public points of interest, etc., it would be dangerous to venture. I am a great believer in individuality, and I think that the interest and picturesqueness attached to much that one sees is owing to individual growth and conditions. I have always been opposed to any censorship in matters of art. A strict supervision and guidance over cornice lines, color scheme, etc., can be satisfactorily handled in the planning and designs of an exhibition, or a fair, or of some pleasure grounds, but where many individual tastes and needs are to be consulted I think too many restrictions are dangerous, if not impossible.

"This is a very large subject and could be gone into much more exhaustively, but I think I have outlined my ideas roughly."

* * *

Circular fireproof stairways represent a farther adaptation of fireproof tile to modern building. In the New York custom house two pairs of semicircular fireproof stairways have been built leading from the sub-basement to the top floor. In many respects these stairs represent an extreme advance in the fireproofer's art. They consist of hard burnt tile slabs built up in the form of the arch so that they are self-supporting and entirely secure against any damage from fire.

* * *

Fireproof domic ceiling is but one of the several recent uses to which terra cotta burnt tiles have been put. The tile dome is even more interesting. It suggests even more pertinently than the domic ceiling the fear of collapse.

Monument Erected at Van Ness Avenue and Market Street, San Francisco, in Honor of the California Volunteers

Douglas Tilden, Sculptor

Terra Cotta and Brick

Thinks Terra Cotta Tiling for Floors a Failure

By JOHN D. GALLOWAY

I HAVE no hesitation in saying that, considered as a material to form a floor which shall have a reasonable degree of fire-resisting qualities, terra cotta tiling is a failure. As the fire which succeeded the earthquake has obliterated most of the earthquake effects in such materials, it is questionable just how well the terra cotta tiling resisted the earthquake. I am of the opinion that the racking of buildings by an earthquake would start the joints of tile arches.

There was one building at Stanford University, that is, the additions to the Museum, where tile arches were used for floors and which now seem to be in a reasonable state of repair. This last observation is contrary to my former statement, but the building in which this terra cotta flooring was used was a low, two-story structure. Aside from this, I have not seen any building with terra cotta floors which was not burned after the earthquake. Hence, such statements must be an opinion only.

The evidence in favor of this material in those buildings subjected to fire was not of the best. In the Mills building, the floors were all practically destroyed and must be taken down. The principal effect of the fire seems to have been the disintegration of the mortar joints and a spalling of the lower face of the tiling. Similar effects were observed in the Union Trust Company's building and in the Crocker building, but with what damage to the floor, as a whole, I am not able to state. The floors of the James Flood building were of terra cotta tile, of the true arch form. This tile was practically uninjured excepting on the first and second floors. Here the damage was principally the spalling of the lower face of the tile. It is necessary to state, in this connection, that the tile arches were protected on the under side by a well built, plastered ceiling, on wire lath. On the upper side, they were covered with concrete and, hence, were not exposed to quite as severe a test as the other floors mentioned.

It is my opinion that for floors in buildings having a steel frame, with the ordinary steel beams and girders, there is nothing better than concrete. Any number of examples exist of this character of flooring, which stands today in practically as good condition as before the fire. Among such buildings may be mentioned the St. Francis Hotel, the Shreve building, the Mutual Savings Bank, the Merchants' Exchange and others of similar construction. There seems little to be desired as an improvement in the construction of such floors. Concrete thus built, with a web of metal reinforcement, is apparently the best thing that can be found at present. About the only objection to it is the fact that in San Francisco there are no cinders with which to build a light concrete. The new Building Ordinance contemplates the use of broken brick and broken terra cotta for such purposes, and in short spans this is believed to be as good as cinders.

Regarding the so-called long-span construction, there were few examples of this type of floor subjected to fire. In the Young building, on the corner of Spear and Market streets, there were concrete floors having a span of some sixteen feet. Intermediate beams were formed by iron straps, which were fastened to the steel girders by being bent over the same. These iron straps hung in the form of an arc and supported directly a concrete beam. While theoretically not a beam at all, it must be stated that this type of construction stood the fire test very well. Another example of such floor construction is that of the Academy of Sciences building, constructed a number of years ago on the Ransome system. With the exception of a few spots where the concrete spalled off on the lower side, leaving the rods exposed, this floor is intact and the building would be as good as ever, structurally, if the brick walls had not been shattered.

A number of types of floor construction, combining the reinforced concrete beam with reinforced concrete girders or with steel girders, are on the market. So far as sustaining power against vertical loads is concerned, such floors are ample for the purpose designed.

Going a little outside of the subject of this short paper, I would say that the principal problem of the designing of such floors seems to be that of making such connection with the vertical sustaining members that the structure as a whole will resist the horizontal strain due to an earthquake. If due consideration be given to such horizontal strains in buildings of moderate height or over, some devices are necessary to take care of the diagonal stress which necessarily arises when an earthquake or the wind shakes the building. Any such design must have something to do with floor construction, and may result in bringing about a modification of the present methods.

In conclusion, I desire to state that it does not seem to me necessary to hunt farther for a different material for floor construction. Concrete has proven itself amply sufficient to withstand the test put upon it by the earthquake and fire. Having been found good, there seems to be no reason for searching farther.

No statement is made regarding wooden floors, because I believe the wooden floor to be bad in nearly every respect. I believe that if the architects made proper representation to their clients, the slight difference between the cost of a wooden floor and the cost of a concrete floor would allow of the better floor being constructed in all ordinary cases.

* * *

Bricklayers of Thirty Years Ago

APROPOS of the discussion which was carried on in these columns some months since relative to the amount of work which the average carpenter of the present day ought to be able to execute, it is interesting to note the plaint of a builder who was actively engaged in the business something like thirty years ago. In a communication to a recent issue of the Record and Guide he sets forth his views in the following words:

"When I look back to the good old days when men worked and compare the conditions as at present existing, I feel that notwithstanding what some say about the benefits of unionism the detrimental effect of organization upon labor is very great.

"Thirty years ago a bricklayer was ambitious to become a lineman; it was the builder's custom to pick out his best men and put them on each end of the wall; they were in charge of the line; as soon as they had laid up the ends they called 'line' and raised the line for the next course. The men in between were compelled to work at a speed set by the linemen, and failing to keep up with them were considered less worthy and were retained only as long as was absolutely necessary. The men who were able to keep up with the linemen were most steadily employed.

"A builder watching his men at work was enabled in a few minutes to figure how many brick could or would be laid in an hour, and by using the same linemen on his work he had a good idea of the result in advance as far as his labor was concerned. These linemen did not work at their top speed, but assumed a steady gait and expected the others to keep up with them. The men in between were ambitious to become linemen, and the net result was a steady, conscientious amount of work which today is absolutely unknown.

"A man who laid 3000 brick a day was not an unusual man, and there are some men in the building business still who tell of 4000 to 4500 brick for ten hours. Today 800 brick in eight hours is considered an average day's work.

"What has caused this condition? Men are just as strong as they were; men are just as intelligent as formerly, but a rule of the bricklayers' union has come between the ambitious man and his employer. If the lineman calls 'line up' before the other members of his union on the wall are ready he is reported to the union and fined $25 for the first offense and $100 for further violation of this union regulation. In other words, the slowest man sets the pace for all the others, because he is a member of the union and must be protected in his laziness and indolence.

"What incentive is there for a man to be better or more competent than another, when he is threatened with losing a week's pay if he does not keep down his speed?

"A builder can employ only members of the union, and in busy times there are not enough men of any kind to do the work, to say nothing of their incompetency. Apprenticeship is limited and the supply of mechanics in every line is decreasing in direct proportion to the increase of the amount of work to be done. Something is certainly wrong; wages are increasing, hours are decreasing, the amount of work to be done is multiplying many fold, and to cap the climax the union limits the amount of work a man may do.

"Formerly a good man was paid more than an inferior man; the good man saved some of his surplus earnings and eventually started in business for himself. Today the statement is heard on every side that the mechanic cannot advance the way he did in the olden days; that once a mechanic always a mechanic; simply because a good mechanic is as poor a mechanic as the poorest; they are brothers in the union and the union comes first, ahead of ambition, ahead of conscience and almost invariably ahead of the family."

* * *

Use of Peat in Brickmaking

IN Germany they are mixing coal and peat, making a compressed mixture, which has been used as fuel in a brickyard with a result so favorable that it will no doubt open a new field for the use of peat fuel in brick manufacture. In the neighborhood of Jevers, Oldenburg, an excellent heavy blue clay is found which was considered suitable for the manufacture of hard clay paving bricks. All efforts to manufacture such bricks from this clay proved unsuccessful until a mixture of one part of peat and ten parts of coal was tried as fuel. The result was a hard, brown brick instead of the light red brick which was produced formerly. The experiments were repeated until at last a first-class brick was produced. So much for fuel in brick building.

Oakland Bank Building of Brick and Terra Cotta
C. W. Dickey, Architect

Brick That Will Stand Fire

BRICK that will withstand all heat and cannot be burned with fire are soon to be manufactured in Monterey. Luke Houze, president of the Monterey Glass Works, claims to have discovered a method to make brick which is absolutely fire-proof. The brick cannot be burned from the outside and will extinguish the flames that start on the inside of the building. Mr. Houze has been experimenting with the manufacture of brick for many years and he has at last perfected a substance which he believes will revolutionize the brick industry in California and make the construction of fire-proof buildings a fact.

Some time ago a committee was appointed by the Merchants' Association of Monterey to investigate the conditions under which Monterey might offer factory sites and other advantages to manufactories desiring to locate on Monterey bay. The committee held a meeting and found that their invoice of stock on hand consisted of one of the best harbors in the world, excellent railroad facilities, cheap fuel, in the shape of oil at 55 cents a barrel, and an equable climate where an operator could produce 20 per cent more of manufactured products than in climates more severe, owing to extremes of heat and cold.

The committee then went out to the site of the Monterey Glass Works and interviewed the president of the company, Mr. Houze. He showed them a brick that he stated was fire-proof in the fullest sense of the word, and also possessed other qualities and some were as follows:

It was a non-conductor of heat, cold, sound and moisture, and also could be used as an insulator. It was about one-third of the weight of the ordinary building material. It would neither expand, contract nor explode under extremes of heat or cold or when deluged with water under either condition. The material from which the brick was made—magnesia and silice rock—existed in large quantities in the Monterey peninsula and was of easy access and the cost of production was small. This material could be furnished as a building material as cheaply as the cheapest building material on the market. It could be furnished in granulated form, in sacks or barrels and mixed upon the ground where the building was to be erected. Nothing but cold water and ordinary skill would be required in mixing it. It could be pressed into brick form and used for building purposes, both for the walls and floors of steel structures. It is invaluable as a material for building partitions, being a non-conductor of sound and of light weight. The committee obtained a brick of this material that had been moulded by hand for their inspection. They applied heat to one end of this brick, that was two inches in length. The amount of heat was about 2000 degrees, and after ten minutes of exposure to this heat, Mr. Peterson held the brick in his hand without any inconvenience to himself, holding it by the opposite end from that to which the heat had been applied. The brick was only two inches long. This material under this terrific heat did not expand nor contract nor change its shape in any manner. Mr. Peterson then plunged the brick into a bucket of water and the only change noticeable was a slight glazing or a vitrification of the spot where the heat had been applied. In fact, it was a better brick after the experiment than it was before, having become firmer.

Mr. Peterson declares there would have been no ruined safes or vaults in San Francisco had two or three inches of this material been used as packing for the safes or casing for the vaults.

The magnesia and silice rock after it is mined is crushed and pulverized and mixed with secret ingredients. It is then pressed into bricks and allowed to dry in the air. It sets rapidly and can be used in three days after it is manufactured. It is not cooked like the ordinary brick.

Mr. Houze states that if a room which was lined with this brick took fire the contents of the room would burn, but the fire could go no farther, as the brick would prevent it. Ceilings lined with this brick would stand intact and would not relax nor contract with the heat as was the case in the San Francisco fire. The fire-proof walls would confine the fire to the room and it could not spread. Even if there were steel girders across the ceiling and these were lined with the new brick the steel would not get warm, as the brick is a non-conductor of heat.

* * *

Tile Construction

By W. E. DENNISON, President of Steiger Brick and Terra Cotta Co.

THE fact has been clearly demonstrated that here in tile construction is to be found a system of fire-proofing which cannot only be installed in less time than is required by any other system, but also at much less cost.

Tile construction will answer every requirement and condition of a truly fire-proof building. It does away with the use of structural steel and the noise which would result in the assembling of members and in driving of rivets.

The discarding of steel frame work also lessens the cost by one-half, and the time taken in manufacturing steel will be three times as long as that of making tile; whereas work can be started immediately with this system.

The exterior walls are built entirely of hollow tile, the floors being of long span hollow tile construction, reinforced with steel bars, and reinforced columns and girders of concrete.

Eight, ten or twelve-inch tiles, varying in depth according to span, are placed between the lines of concrete joists, which have a uniform width of four inches.

Besides greatly lightening the construction, this system has the advantage of giving a drier floor and one more nearly sound-proof. But the remarkable distinction is realized in the shorter time occupied in erection over that consumed by any system where a solid concrete slab is used.

The outside surfaces of these wall tiles are made with a depressed groove which gives a very strong bond to the plaster. The double air-chamber of the tile makes impossible the conveyance of moisture through the wall.

One of the greatest advantages gained is the elimination of inside wall furring, the plaster being applied direct to the tile.

Many other advantages are gained, such as the greatly decreased cost of insurance and repairs, and the more satisfactory insulation of heat and cold. The structure taken in itself would be virtually monolithic.

The treatment of the exterior may be varied by the use of colored tile, terra cotta panels or spandrels.

Summed up, the advantages of this system are: Fire-proof, time saved in erection, cost saved in erection, light construction, dry floors, sound-proof floors, moisture-proof walls, elimination of furring, and decreased insurance.

* * *

Brick Famine at Salt Lake

CONTRACTORS in Salt Lake, Utah, are on the anxious seat owing to the scarcity of brick in the local markets. According to their statements and of architects, practically every job in Salt Lake City is being held back, if not absolutely brought to a standstill by this brick famine, and architects say it may last for the next sixty days. The scarcity appears to be mostly in finished brick, for which there is a steadily growing demand, and if there is not enough of this everything else has to stop.

The brick men admit the scarcity, but call attention to the fact that with 11,000,000 brick on hand at the beginning of the season, the great smelter at Garfield took 8,000,000, and is likely to require 8,000,000 more. Then there is yet another smelter to go up at Murray that will require 2,000,000 brick. All this with the constantly growing demand in many other directions for general building is making things warm for the brick makers. But it is claimed that the four large brick plants and the smaller affairs in the valley are now turning out 375,000 brick a day, so that in the course of the next thirty days the stringency will be relieved.

The brick men say that the prolonged wet weather spoiled a great deal of brick in making, so that for a time filling orders for special classes of finished goods was almost impossible. But by another season the local plants will be in such shape that bad weather will have no effect on them. The Salt Lake Brick Company, for instance, is completing a $60,000 plant, about 800 feet long and five rods wide, which will turn out 200,000 brick per day without trouble, and with no delay on account of weather. The brick makers claim that they will be able long before fall to fill all orders without delay, and that the agitation for an increase in the number of present plants is unnecessary.

Cement and Concrete

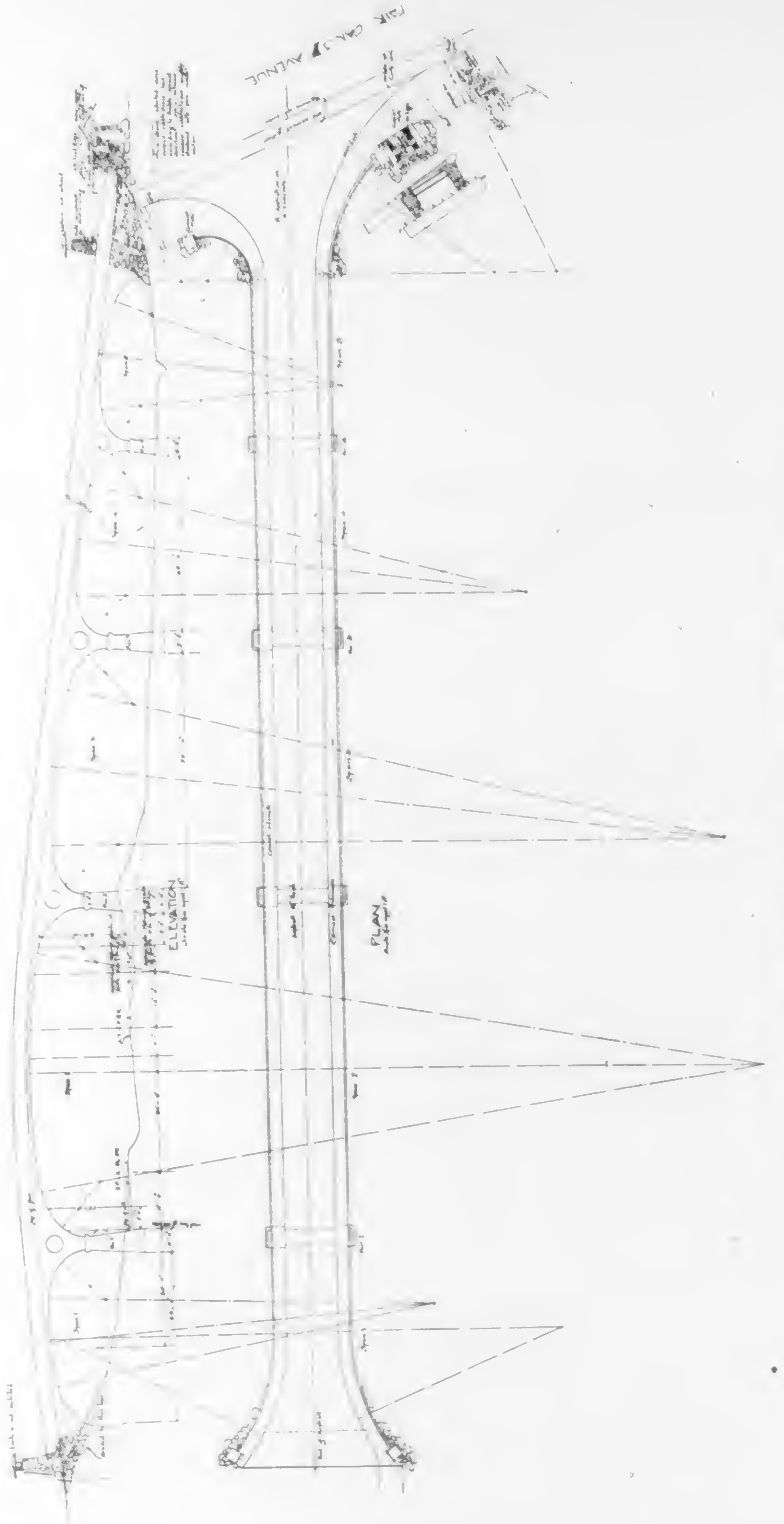
A Discussion of a Reinforced Concrete Arch

By A. V. SAPH

THE reinforced concrete arch bridge, recently constructed at Oaklawn, South Pasadena, California, for the purpose of affording passage over the lines of two railroads consists of five arches of variable span and rise. Each of the arches is five-centered. The clear spans are about 45 feet, 82 feet 6 inches, 62 feet, 46 feet 6 inches, 41 feet 0 inches, and the rises are about 11 feet, 14 feet, 10 feet, 9 feet, 9 feet 6 inches for arches 1, 2, 3, 4 and 5 respectively, these figures having been scaled from the drawing, definite dimensions being absent. The depth at the crown of the arch in each case seems to be about one foot. The clear roadway is 19 feet. The reinforcement consists in each case of 32 rods placed longitudinally 2 inches from the intrados and extending down about 1 foot below the top of the coping around each pier. These rods have diameters of 1 inch, 1½ inches, 1½ inches, 1¼ inches and 1 inch for arches 1, 2, 3, 4 and 5 respectively. The piers are reinforced with vertical rods spaced 2 feet 9 inches and horizontal rods spaced about 1 foot. An elevation, plan and details of this structure are shown in this number of the journal.

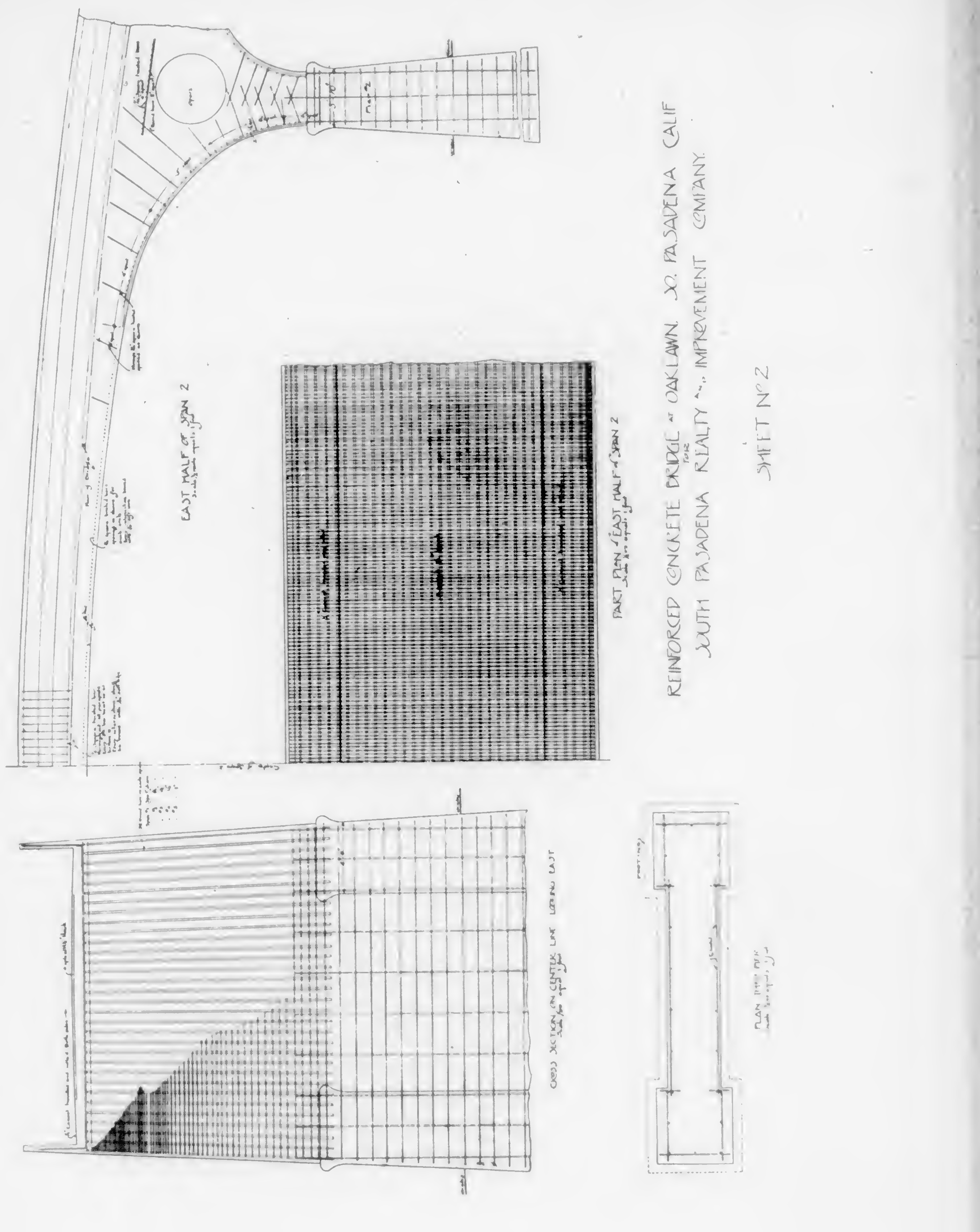
The bridge is, however, particularly interesting at present on account of the partial failure which has taken place. Cracks have appeared in the arches, and these, according to late information, extend to within 6 inches of the intrados in arches 2 and 3, and to within 1 foot of the intrados in the others. The accompanying photograph shows one of these cracks, and from this photograph the nature and position of the other cracks may be judged, since other pictures not presented are very similar. These cracks are open at least ¼ inch in the morning, but are closed later in the day, and it is not going too far to anticipate that total failure may be impending from the continual hinge action on the still uncracked portions from changes in temperature and the more frequent action of passing loads. It is interesting, however, to note that since the cracking occurred, the center arch has been tested with a load of 18 tons and there occurred a deflection at the center of 3-16 of an inch.

These cracks in the arches are undoubtedly due to the setting up of tensile stresses along the extrados of the arch with no provision in the way of reinforcement made to take them. These tensile stresses may be induced either by a condition of loading or a fall in temperature, and these may act separately or simultaneously. This absence of reinforcement is a point that immediately attracts attention upon inspection of the drawing, to one who is familiar at all with the examples mentioned



SHEET No 1

REINFORCED CONCRETE BRIDGE AT OAKLAWN SO PASADENA CALIF
FOR
SOUTH PASADENA REALTY AND IMPROVEMENT COMPANY


EAST HALF OF SPAN 2
PART PLAN OF EAST HALF OF SPAN 2
CROSS SECTION ON CENTER LINE LOOKING EAST
PLAN, PIER

REINFORCED CONCRETE BRIDGE AT OAKLAWN SO PASADENA CALIF
FOR
SOUTH PASADENA REALTY AND IMPROVEMENT COMPANY

SHEET No 2

from time to time in the engineering papers, which unifo provide such resisting material. Usually this reinforcement ext over the whole span, even though the conditions may not demand it such a length. There is, however, a need for reinforcement extend from a point directly over the pier to a point well toward the cen The conditions in the present case are similar to a beam at least partia fixed at the ends extending between those points where the sectio begins to increase rapidly.

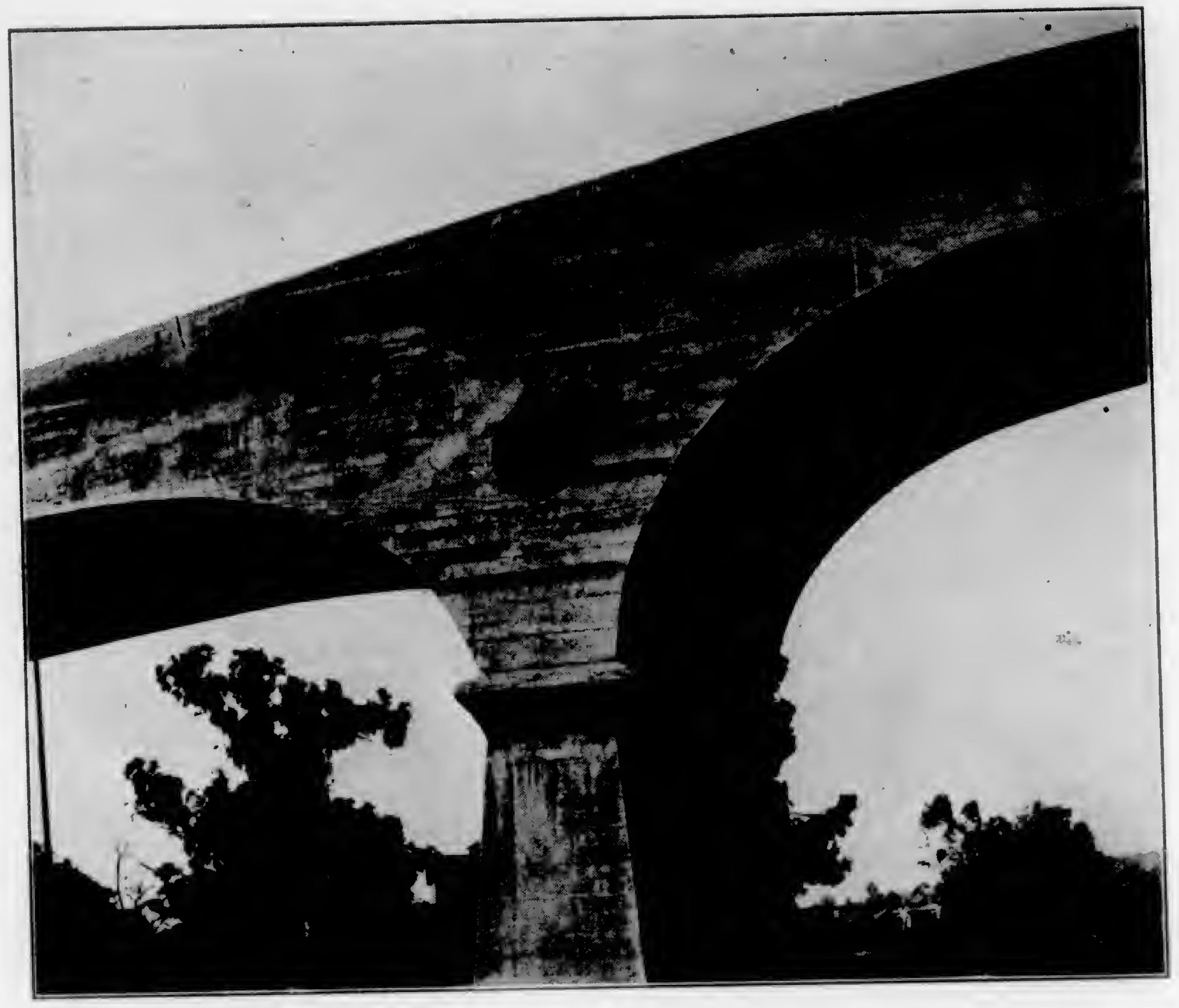
The conclusion that the reason for the partial failure is to be found in the omission of this upper reinforcement, as stated, is strengthened by the fact that not only one, but all, of the arches cracked, the cracks being similar and similarly located. Since these arches acted so consistently, the arches must each have the same inherent defect, which could have been avoided in the design by a complete analysis.

Aside from the absence of extradosal reinforcement, which is the great apparent defect in the design, several other criticisms seem to be in order. The amount of material called for in the way of rods laid transversely is decidedly excessive. The rods called for by the design are 7-16 twisted rods spaced 3 inches apart at the crown and 6 inches apart at the springing, and there is no reason why a spacing of 1½ or 2 feet would not be sufficient. Their main purpose is to prevent longitudinal cracks, and these cracks, if they occurred, need not affect the stability of the arch. They would, however, offend the eye and might cause apprehension in the minds of people unable to recognize them as possibly unimportant, and for these reasons they should be avoided. This great excess of material might have been advantageously employed where reinforcement is more urgently needed and has not been called for, that is, along the extrados.

The writer has been informed that in construction twisted rods were used longitudinally and corrugated bars transversely, and the following criticism therefore applies only to the design as shown and not to the arch as constructed. The drawings call for round rods placed longitudinally along the intrados and twisted rods placed transversely. The longitudinal rods are main rods and the transverse rods are secondary. We thus have an evidently inconsistent use of the materials, since the object in making twisted rods is to increase their holding power in the concrete and fit them to act more efficiently in doing the work. They should be placed, then, in the working position.

Over the circular openings left above the piers there is a network of reinforcement, the purpose of which is not altogether apparent. The writer cannot imagine any reason for providing bars spaced at 4 inches across the bridge and 2 feet apart parallel to the center line of the bridge. If the purpose is to provide for strength over the opening, or if it is an attempt to provide continuity over the piers, it is not a good design in either case.

The sections of the piers and abutments and their footings as called for by the drawings seem light and insufficiently reinforced, but no definite conclusion regarding the necessary sections can be arrived at without a thorough analysis of the problem. If they are light, they would make it possible for one arch under a heavy load to set up stresses in the adjacent arch as well as in the piers. The arch theory, as usually applied, has for two of its assumptions an invariable span and a fixed direction at the springing. In the design there is no sudden transformation from arch to pier, but there is a sudden change in the amount of reinforcement, which appears an item to be criticised. The reinforcement is mainly horizontal, while apparently it should be vertical.



North Face East End of Big Arch, Reinforced Concrete Bridge, South Pasadena Showing Crack on the Right

The lesson from the omission of the extrados reinforcement of the arch and the partial failure may well be borne in mind in the design of beams fixed at the ends and also continuous beams where reinforcement must be provided on the loaded side of the beam at the ends and over the supports. The neglect to provide such reinforcement may result as disastrously as in the case under consideration, since the conditions are similar.

This failure does not reflect in the least upon the concrete steel type of construction. A failure to provide against all possible contingencies may lead to serious consequences in any type of construction. The fact that so many concrete steel arches have been built with no signs of failure gives evidence that the trouble might have been avoided in this case.

Finally, the bridge failure mentioned merely emphasizes the importance of making a most careful analysis of all the conditions of a problem and making sufficient and logical provision to satisfy the demands of the case as presented by the analysis. The most satisfactory design will be that which, in addition to merely meeting the requirements, will do so most advantageously and economically.

The writer, of course, has no desire to reflect on the professional ability of anyone connected with the building of the arch, but it is certainly desirable in events of the kind we have considered that the facts should be known and a full and fair discussion invited.

Reinforced Concrete in the Pacific Northwe

By CARL E. ROESCH

IN the face of the discussion going on in San Francisco as to the relat merits of the various kinds of building material, it is interesting to n the progress being made by all the cities of the Pacific Northwest towar the adoption of reinforced concrete.

Seattle has for several years been erecting buildings of this material, one of the most notable being the Carnegie Public Library, the "Clinton" system of electric welded steel being used in the floor construction, the exterior being stone faced.

An interesting example of the absolute concrete building is found in the "Waldorf Apartments," now just reaching the second floor, plans by Architects Howles & Stokes, of New York, Mr. Ryan of Seattle supervising. The General Engineering & Construction Company is erecting the building, using the Kahn system.

Two shifts of men are being employed, the concrete men working at night and the carpenters in the day-time.

Portland, Bellingham and Spokane have recently completed several large buildings of concrete, in fact all the cities in the Northwest have demonstrated very conclusively that concrete, considered from every view point, is the type of construction which gives greatest satisfaction.

Numbers of architects and engineers with whom the writer has talked, have expressed regret that there were not more examples of absolute reinforced concrete buildings in San Francisco, from which deductions could be made as to the effect of earthquake and fire upon such structures.

It is to be hoped that those interested will see the folly of the constant opposition which has been so successfully waged against the admission of this type of construction and will see that concrete engineers are given an equal opportunity with other artisans, so that our new city may be made up of all the representative types of buildings.

* * *

Cement Sidewalk Construction

ONE of the most common and important uses of Portland cement is in the construction of cement sidewalks. Not alone is cement the most generally used material for city and park walls, but it has taken the place of boards in the smaller cities and villages. Owing to the comparative ease of making, durability and enduring smoothness it has practically eliminated stone flagging and brick from the list of walk materials. Even in the sections where stone abounds, and where Portland cement is high in price, owing to excessive freight rates, concrete takes the preference and displaces the stone. There is nothing that so fully and satisfactorily answers every requirement for sidewalks as does Portland cement concrete. As a general reply to numerous inquiries relating to cement walk building we are treating, perhaps somewhat elementarily, the subject in detail.

Essentially there are three parts to a cement sidewalk—the prepared foundation, where one is necessary, the concrete base, and the top coat or wearing surface. Each is a most important factor, the last two having particular dependence, one upon the other.

Whether a prepared foundation is at all necessary depends upon the character of the soil, and the contour of the surface of the earth where the walk is to be laid. If the soil is sandy, and the underlying strata is porous to allow good drainage, no prepared foundation is required, as the walk

could be made directly upon the sand in a shallow trench sufficiently deep enough below the grade line. Should the sandy land lack the necessary drainage owing to a clay subsoil, or if the land is clay, there must be a foundation prepared of considerable thickness. The sole purpose of this prepared foundation is to provide drainage that ice and water will not cause the walk to crack and otherwise get out of order. An excavation of at least twelve inches from the grade line on the top of the wearing surface should be made. Into this shallow trench broken stone, gravel cinders, or even well-broken brick and tile should be placed and thoroughly packed down to the thickness of eight inches and leveled to make the course uniform and to conform with the grade. Upon this concrete for the body of the walk is applied.

Various experienced builders use somewhat different mixtures, but one will meet most satisfactory results if the concrete for the body is composed of one part Portland cement, 2½ parts clean sand, 5 parts gravel or broken stone, the broken stone being small enough to pass through a one-inch mesh sieve. The cement and sand should be mixed together dry and most thoroughly. The fine stone should be dampened so every part of surface is wet—when the cement and sand as mixed should be added and all thoroughly stirred with water being applied until a good wet mixture is obtained. Care should be exercised that the mixing is complete—not partial.

The concrete placed upon the foundation should be well rammed into place and as wet that when compacted a film of water shows on top, and tightly against the planks which should be placed at the sides and on line with the top of the walk at the beginning. When properly packed it should be cut into slabs about four feet square, the cuts being made through to the underlying material. In commercial construction a section is made, then a strip passed by and another section laid, which allows the workmen to get at all sides of the work. Parts of blocks should not be made to be added to, but each slab should be made continuously. Retamping should under no circircumstances be allowed. In the walk building specifications as given by the public service departments in our large cities a most conspicuous clause forbids retamping.

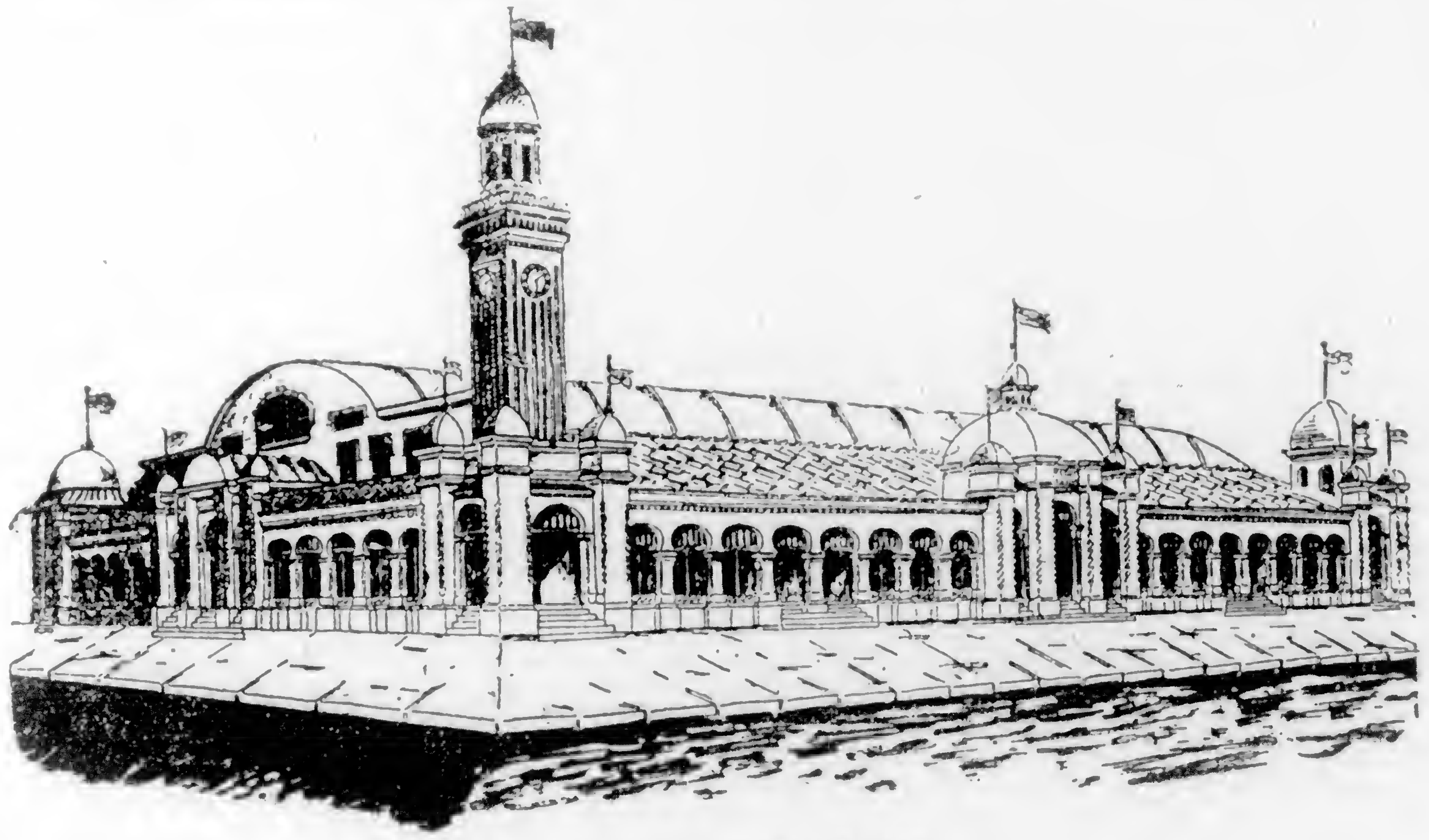
The top surface should be one inch thick. In many sections, particularly small towns and where cement is very high in price, a one-half inch coat is used. In any case this should be composed of equal parts of cement and fine sand or granite chips. This should be of the same kind of cement as the base, and should be placed as soon as possible after the body is completed so that the surface will unite properly with the base. Never try to construct a walk by using natural cement in the base and Portland cement for the top. The two cements do not unite freely, and the result is unsatisfactory. The top coat should be floated and trowelled smooth. Too much trowelling is bad, as it brings the cement to the surface, causing cracking and scaling by making one part too rich, another lacking in richness. The joints and edges should be run smooth by use of a jointing tool.

The surface should then be cut into slabs the size of and to correspond with those of the base, so that settling of the ground or changes by freezing and thawing will not crack the concrete. After it is trowelled smooth level with the top of the grade it is best to crease the surface by means of passing over it some form of light roller made for the purpose. A perfectly smooth surface causes the walk to be slippery in wet and freezing weather. It is popular to sprinkle marble dust upon the surface, which adds greatly to the appearance. Avoid sprinkling dry cement upon the top. An important element in securing the best results is keeping the new walk wet for some time after completion. As soon as the workmen are through it should be well saturated and protected by canvas or other covering from the sun. water causes more perfect crystallization. After the first day the cove can be removed and the surface covered with sand or sawdust, which sho not be removed for fully a week, during which time it should be kept spi kled with water. The wooden strips at the side should not be removed some time.

The cost of cement walks naturally varies, owing to cost of materials and accessibility of them to the place of construction. At the present price of Portland cement, and the prices of sand and broken stone and cinders one should not expect the work to be done at less than nine cents per square foot, especially where the earth is calcarious and the work in excavation requires considerable time. This alone often costs a cent per foot. Where the walk can be made upon a sand foundation it could probably be built at a cost price of seven cents.

In San Francisco, before the earthquake, walks of three-inch thickness, 2½-inch base and ½-inch surface, were made upon the light soil at a cost of nine cents, but here Portland cement costs $2.50 per barrel and the beach sand $1.20 per cubic yard.

Lately the tendency has been for contractors to make too low a price, the result of which is the work must be of somewhat inferior quality, or the materials must be skimped or the quality slighted. We are of the opinion that the honest walk builder should receive fully eleven cents per square foot for every foot of walk he builds, and the party having the walk built can well afford to pay twelve to fourteen cents for good work. It is worth every cent of this price.—Concrete.



Sketch for Proposed Coliseum, San Francisco
Philip Schwerdt, Architect

Heating, Lighting and Electrical Work

Fads and Fallacies in Hot Air Heating*

By R. S. THOMPSON

IN ORDER that I may not seem to claim all wisdom in this matter, I ask you to interpolate the words "it is my opinion" before each of my statements. These are my "opinions" based on study, observation and experience. Some of them will probably commend themselves to your judgment. Some may be fads of my own. Some may themselves be fallacies. I believe they are all worthy of our consideration and discussion.

It is a fallacy to suppose that a set of rules can be formulated by the observance of which any man can heat any building. In no two buildings will exactly the same conditions be found. Each building is a proposition to itself. Without an intelligent comprehension of the principles involved, an ability to closely examine conditions, ascertain causes, reason from effect to cause and from cause to remedy, a set of rules may be more of a hindrance than a help. There is no profession in which a "little learning" is more often "a dangerous thing."

Something over a year ago I was called to examine a large church, the heating of which had been a perplexing problem for more than a generation. The auditorium was always cold for at least two or three feet above the floor. I noticed that even when the church had been long heated there seemed to be downward currents of cold air.

There was unanimity of opinion that something must be done to draw the cold air off the floor. One party had suggested putting in an electric fan and pumping it out. At one time the plan had been tried of cutting off the bottoms of the doors into the vestibule and leaving open the door from the vestibule into the tower. The draft of the tower had caused a strong outward flow of cold air under the doors, but the congregation complained so bitterly of cold feet that the plan was abandoned.

After learning all I could about the plans which had failed, I proceeded to diagnose the case. I had all three furnaces fired to the limit for three hours, and then sought carefully for evidences of "back pressure." I found none. Instead I found at the bottom of every door and window a strong inward current of air. That explained the situation. The building was leaking at the top— leaking so badly that all the air the furnaces could supply was being lost by leakage, and more was being drawn in from outside, which, being cold, of course settled on the floor. Had I followed the rule "draw the cold air off the floor" (which is the correct rule when a room is "air-bound" and there is "back pressure" on the furnaces), I would simply have drawn in more cold air to settle on the floor. This explained the failure of the plan to use the tower as a pump. This explained the do ward currents of cold air.

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*Read by R. S. Thompson at the convention of the Heating and Ventilating Engineers at Chicago in July.

As the leaks could not be stopped, the only remedy was to pour in air faster than it could leak out at the top, and so "push" the cold air the floor.

I examined the furnaces, and found that when working up to the lim the three could deliver about 1400 cubic feet of air per minute. I took out two of them and put in two others with a combined capacity of 4000 cubic feet per minute, putting in larger pipes to allow this larger flow. With these two going I again examined the building and found air flowing out gently under all the outer doors, but not enough "back pressure" to interfere with the operation of the furnaces. The congregation have not had cold feet since.

It is a fallacy to suppose that you can determine the amount of heat needed for a room or building by ascertaining its cubical contents.

Heat once put into a building would remain there forever, and a building once heated would require no further heat to maintain the temperature were it not for leakage of hot air out and leakage of cold air in and conduction of heat through the walls. But leakage and conduction both depend entirely on wall surface, and not at all on cubic contents, so that wall surface is the only thing to be considered.

I have adopted a rough and ready rule which works well in most cases with the average house, but which, like all other rules, must be used with common sense.

"Divide the number of square feet exposed wall surface by 2. The product is the number of cubic feet of air at 140 degrees that will be required per minute to maintain a temperature of 70 degrees with the outside temperature at zero.

Of course, it is up to the engineer to determine how many cubic feet of air at 140 degrees any given furnace can supply, and how many cubic feet per minute each pipe can deliver. Rough and ready rules will not do in this estimate; an 8-inch pipe will deliver more air under some conditions than a 12-inch pipe will deliver under other conditions.

It is a fad to cover hot-air pipes with a thin sheet of asbestos paper, in order to "keep in the heat." The rough surface of the paper is a better radiator than the bright surface of tin or galvanized iron, and this more than balances the slight gain from the non-conducting power of the sheet of paper. Being spongy, it retains moisture and rots the pipes. The only good purpose I have ever known it to serve is to hide bad joints and botch work. If you must use asbestos, put on half an inch.

It is a fad to set the furnace under the northwest corner of the house with the idea that the air will travel through the pipes more readily in the direction the wind is blowing. Air, while in the pipes, does not know and does not care which way the wind is blowing. Set the furnace where you can reach all the rooms with the shortest pipes and the fewest angles.

It is a fallacy to suppose that you must put a register in the coldest part of the room in order to heat it. It is no warmer six inches away from the current of air that flows from a register than in other other part of a room. The air issuing from a register goes directly to the top of the room, and all heating with hot air is from above downward, no matter where the registers are placed. I should like to try the experiment of heating a house with all the registers in the ceilings. It would at least be a novelty, and I believe would have many advantages.

It is a fallacy to put a register near an outside door or window in order that the wind which blows in through the cracks may drive the hot air over to the back part of the room. If the furnace is working properly there will

utflow instead of an inflow of air around doors and windows. If the enters near these leaks it will flow out through them and the cold ill be pocketed in the back part of the room. Put your register as far ay from the outlet as you can, and the hot air in making its way to the utlet will force the cold air out first.

It is a fallacy for a man to suppose that he can wait till his house is nearly finished before he places his furnace contract and then get good results.

The furnace contract should be let before the excavation for the foundation is begun. As soon as the contract is let the engineer should take the blue prints or tracings of them and lay off on them the entire plan. The location of the furnace, the smoke pipe, the leader pipes from the furnace to first floor register boxes and stack foot-pieces, the stacks, floor-runs, if any, and second floor registers should all be shown. The size of every pipe, stack and register should be given. Then these plans should be gone over with the owner to see that the location of the registers does not interfere with his plans for arrangement of furniture. This settled, copies of these plans should be given to the building contractor, with instructions that as the building progresses openings for pipes are to be left as shown on plans, and the plumbers, electricians and other contractors are not to use these openings nor obstruct the access thereto.

The first clause in the furnace contract should provide that the building contractor is to observe the specifications and plans of the heating engineer the same as he does the specifications and plans of the architect.

It is a fallacy for a man to suppose he can give the building contractor the contract for putting in the wall stacks and registers, and then at any time have a "furnace man" put in a furnace that will heat the house. When I am called on to put a furnace in a house where the pipes were put in by the building contractor I always agree to guarantee those rooms with which I make connections, but tell the party he must go to his building contractor for a guarantee on the rooms for which he put in the pipes.

It is a fallacy to suppose that you can put in a furnace on plans provided by the average architect and afford to guarantee the job. The shoemaker should stick to his last and the architect should stick to his architecture. Not one architect in a hundred has a thorough theoretical knowledge of heating and ventilation, and probably less than one in a thousand has any practical knowledge on the subject. Both theoretical and practical knowledge are needed to secure a successful job. When I am brought a plan on which the architect has laid out the heating work, and asked to follow his plans and specifications, I tell the party that he must go to the architect for a guarantee on the results of the architect's work.

It is a fallacy for a man to suppose that he can have his architect advertise for bids on a heating plant and let the contract to the lowest bidder, and have a properly heated house.

Where this is done the man who gets the contract is the one who has based his estimate on the smallest furnace, the smallest pipes, the cheapest material and the poorest job.

When a test is made he sends an expert fireman, who stands over the furnace with a poker and makes it come near enough to fulfilling the guarantee that the purchaser thinks it better to pay than have a lawsuit.

And from that time on the purchaser has troubles of his own. And he tells all his friends and neighbors that if they ever build they should put in steam or hot water. Hot air is a failure; he knows, for he has a hot-air furnace in his own house.

(To be concluded in the September Architect and Engineer.)

A Modern Heating System

ENGINEERS have been trying for many years to design a system of heating that would have all the advantages of the steam and hot-water systems, with none of their disadvantages or defects—a scheme that would give a wide range of temperature to meet the requirements of the sudden changes in winter and the mild weather of spring and fall. Vapor and vacuum systems in various forms have been put on the market, but—while they have many good points—they do not completely answer the purposes. A variation on them—or rather a new system which embodies all the best features of vapor, vacuum, and hot water, has now been perfected. By the use of the automatic drainage valve, which is placed in the return end of each radiator, and the automatic relief valve, which is connected to the steam and return mains in the cellar, steam can be circulated under a vacuum, at a temperature of 100 degrees F., or at any desired temperature up to 238 degrees, and the heat in any one radiator can be controlled by partially opening the radiator valve.

In this system, the hot-water type of radiator is usually employed, with the steam inlet at the top, and the return outlet at the bottom of the radiator. No air valves are used on the radiators, thus doing away with the most annoying and irritating of all contrivances. The system of piping is the ordinary two-pipe dry-return system, with a loop seal at the end of each steam main.

When it is desired to partially heat a radiator, the radiator valve is opened just a little. The radiator will be heated only in proportion to the amount of steam admitted.

It is claimed that this is the only system of heating where steam can be circulated under such a wide range of temperatures, and the heat be controlled in any radiator. Should a room be too warm, one can partially close the radiator valve, and heat only part of the radiator. Should the room get too cold, the radiator valve can be opened fully. Thus it is possible to control the temperature in each room to suit the occupant, which is surely a great advantage.

The Lichtenstein Building, Market and Davis Streets, San Francisco. Cost $100,000
Chas. J. Rousseau, Architect

Progress Work on Reinforced Concrete Auditorium, Los Angeles, Showing the Completed Roof of Concrete
Chas. F. Whittlesey, Architect

Progress Work on Reinforced Concrete Auditorium, Los Angeles, Showing the 112-foot Roof Trusses
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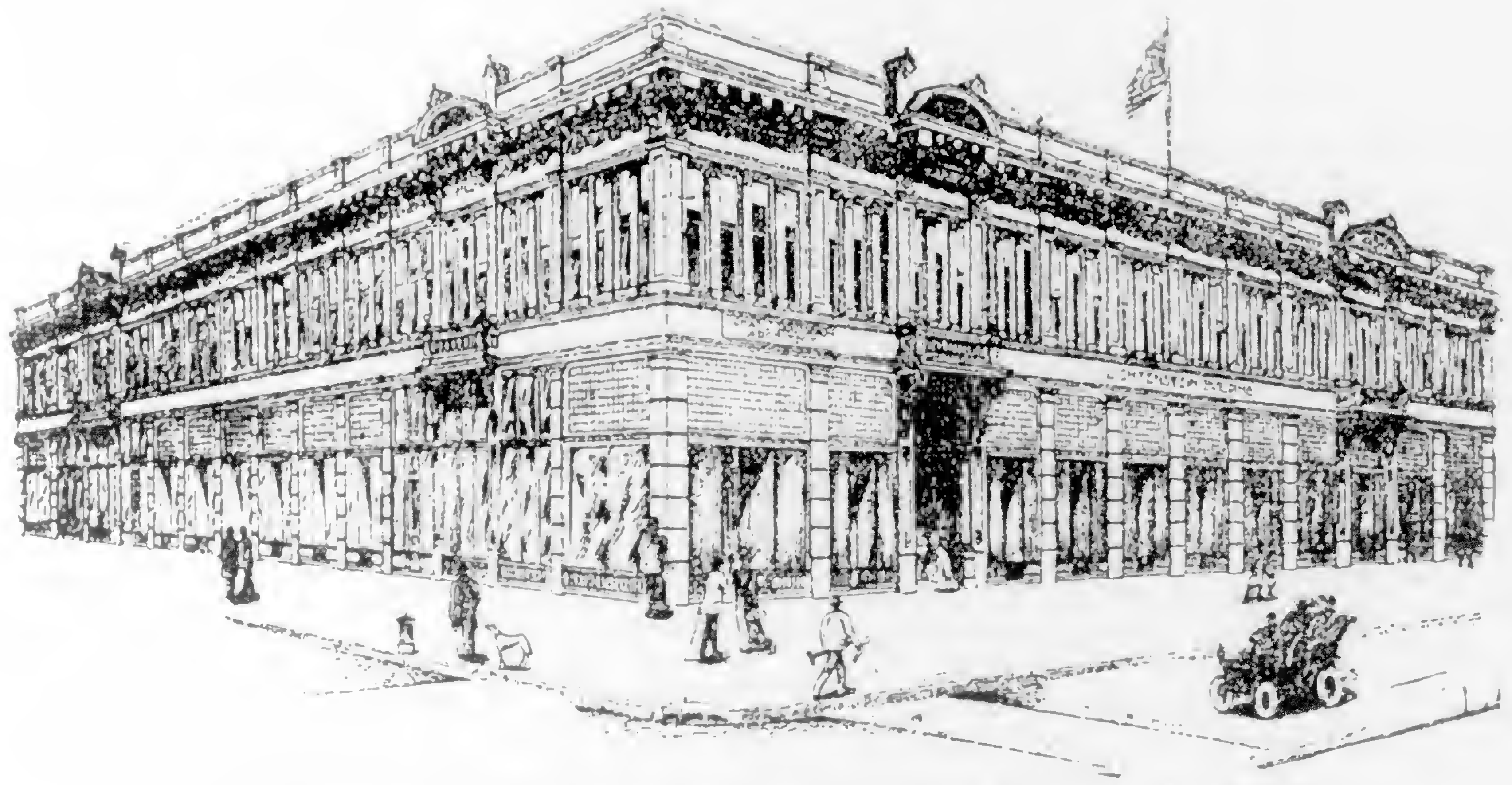

The Lichtenstein Building, Market and Davis Streets, San Francisco. Cost $100,000
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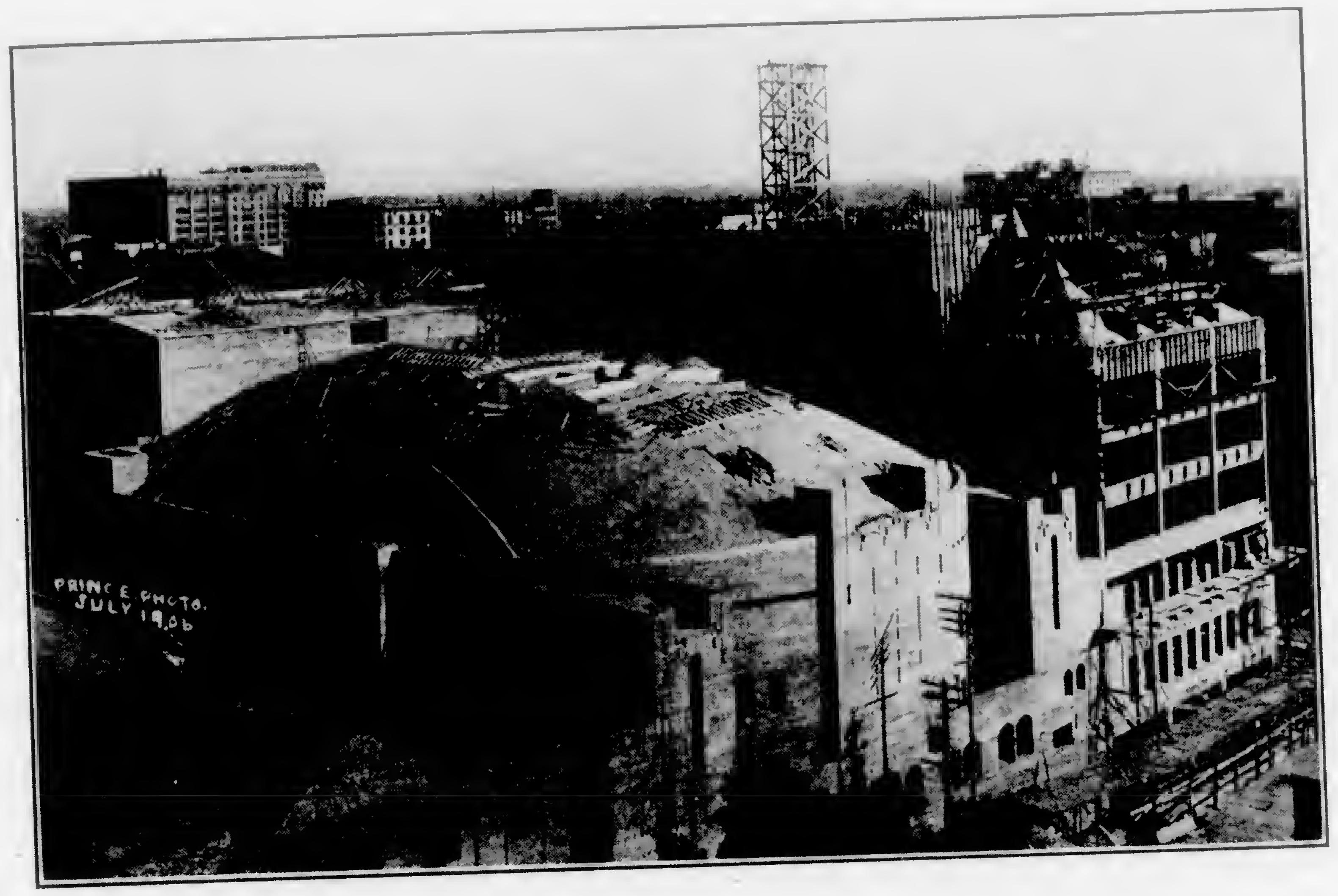

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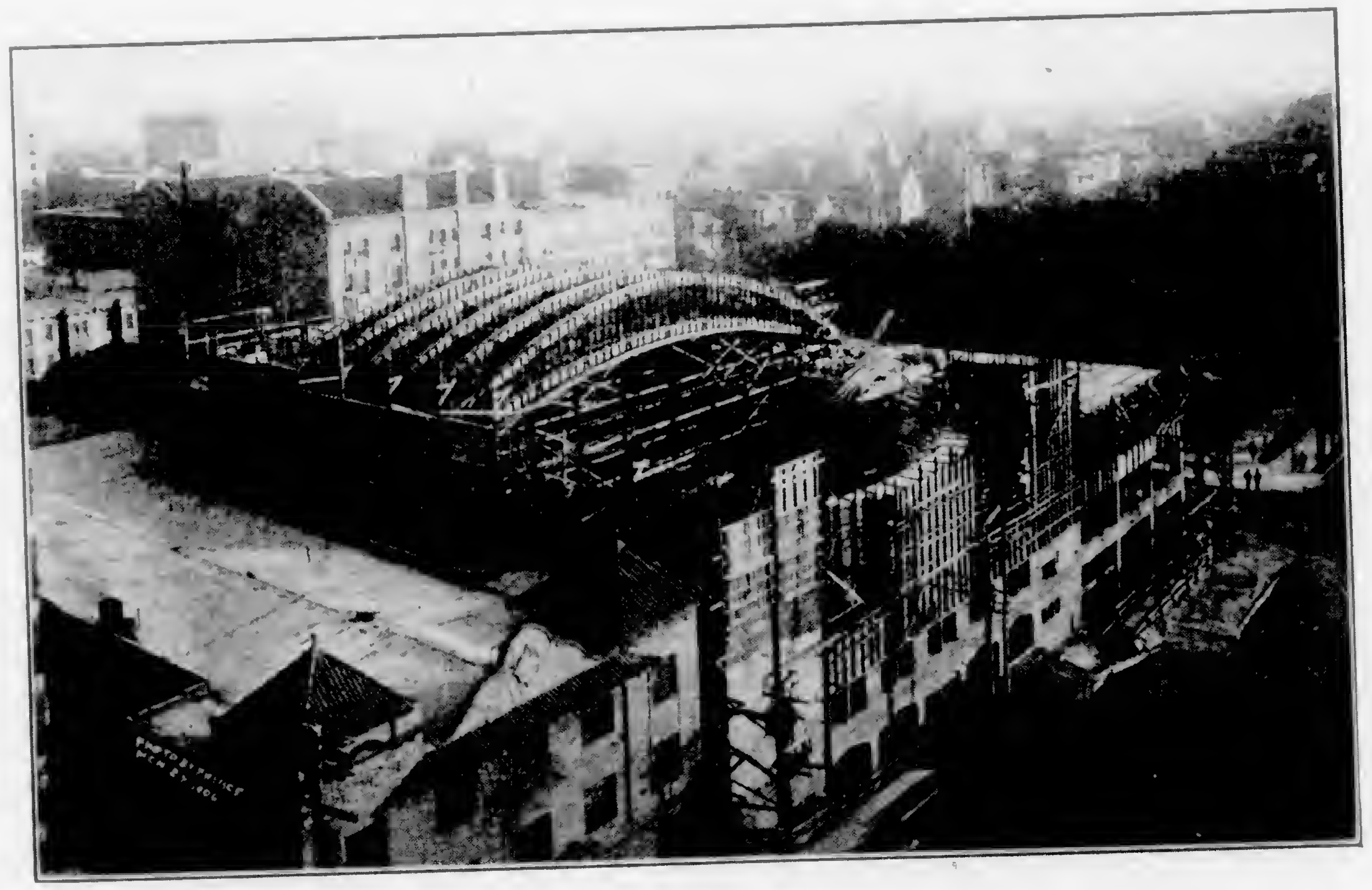

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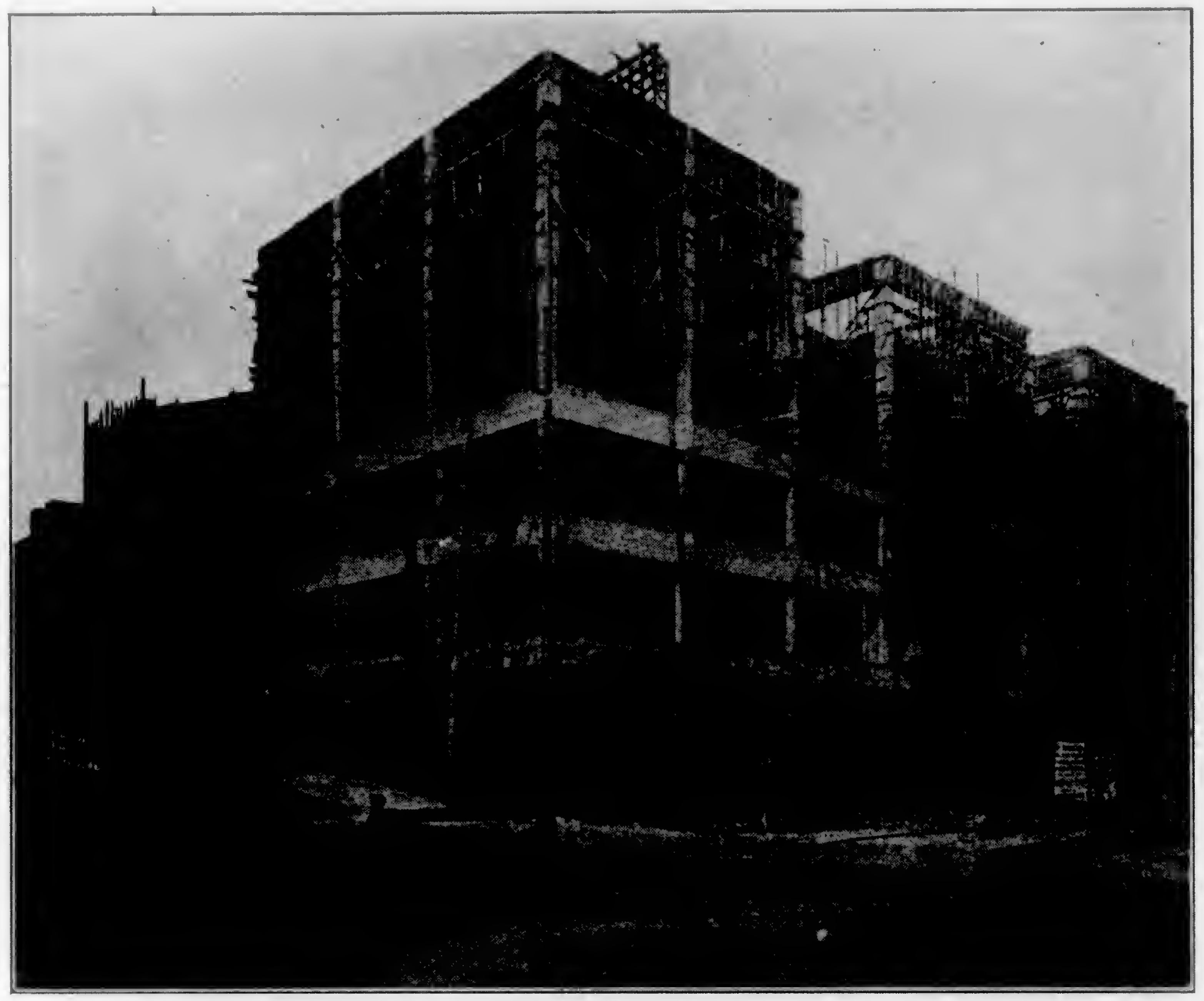

Progress Work on Reinforced Concrete Auditorium, Los Angeles, Showing Office Portion of Building
Chas. F. Whittlesey, Architect

Advantages of Electrical Cookery

IN comparing electrical cooking with the other modes, the ordinary coal cook stove and gas range, certain points are noticeable in which this newer method is more sanitary, hygienic and in some sections economical. The electric cooking utensils are self-contained. Their essential feature consists in applying heat directly to the dish containing the food to be heated and in preventing heat from being transmitted to anything else but the food. The principle of the stove differs in that the food is cooked by transmission of heat from a large exposed surface, which has first to be heated, to the dish, a process which wastes much heat. The best coal, gas and oil stoves transmit only about 30 per cent of their heat to the food contained in the cooking utensil, the remainder of the heat, not lost through the chimney, is consumed in raising the temperature of the surrounding atmosphere and in heating the stove itself as well as the air space between it and the utensils. Modern coal stoves show an efficiency of only 2 per cent. Twelve per cent is partially wasted in heating the stove, 70 per cent goes up the chimney, and 16 per cent is radiated. That is, for every 100 pounds of coal bought and burned, 98 is completely wasted from the cooking standpoint. With the gas stove, 20 per cent is available for cooking purposes, while with the electric stove 90 per cent of the heat can be practically utilized.

Not only are electrical cooking utensils efficient, but, aside from the very evident advantages of the absence of smoke, flame and soot, there is no vitiation of the atmosphere. There is no labor, either, in making or maintaining the fire and no danger from fire or explosion. But the old

nuisance of letting the kettle run dry is still greater in electrical cooking, for if any cooking device runs dry, it is liable to cause the vessel to leak and possibly to burn out the resistance.—Edith M. Darrow in Good Housekeeping.

* * *

Wetting Lead Pencils

THE act of putting a lead pencil to the tongue to wet it just before writing, which is habitual by many people, is one of the oddities for which it is hard to give any reason, unless it began in the days when pencils were poorer than now, and was continued by example to the next generation. A lead pencil should never be wet. It hardens the lead and ruins the pencil. This fact is known to newspaper men and stenographers. But nearly every one else does wet a pencil before using it. The fact was definitely settled by a newspaper clerk away down East. Being of a mathematical turn of mind, he ascertained by actual count that of fifty persons who came into his office to write an advertisement or a church notice, forty-nine wet a pencil in their mouths before using it. Now, this clerk always uses the best pencils, cherishing a good one with something of the pride a soldier feels in his gun or his sword, and it hurts his feelings to have his pencils spoiled. But politeness and business considerations require him to lend his pencil scores of times a day. And often, after it had been wet till it was hard and brittle and refused to mark, his feelings would overpower him. Finally he got some cheap pencils and sharpened them, and kept them to lend. The first person who took up the stock pencil was a drayman, whose breath smelt of onions and whiskey. He held the point in his mouth and soaked it several minutes, while he was torturing himself in the effort to write an advertisement for a missing bulldog. Then a sweet looking young lady came into the office, with kid gloves that buttoned half the length of her arm. She picked up the same old pencil and pressed it to her dainty lips preparatory to writing an advertisement for a lost bracelet. The clerk would have stayed her hand, even at the risk of a box of the best Dixon pencils, but he was too late. And thus that pencil passed from mouth to mouth for a week. It was sucked by people of all ranks and stations, and all degrees of cleanliness and uncleanliness. But 'twere well to forbear. Surely no one who reads this will ever again wet a lead pencil.—Graphite.

* * *

Women as Builders

THE number of women who practice the profession of architecture is very much greater than the number of women architects, anomalous as this may seem.

Most of the women who make a business of building houses have men in their offices who do the architectural part of the work for them. Usually they begin as decorators, and if they prosper they soon find that orders to build houses also come to them. Usually they have previously added an architect to their office staff, or simple efforts at decoration frequently demand the skill of a trained architect. After a while the architect builds the houses when the orders begin to come in. There are women decorators now prosperous enough to have architects in their employ. One of these now occupies a four-story building in a side street off Fifth avenue merely for her own business. She began in one room down town only a few years ago. Elsie de Wolfe has met with great success since she went in for house decoration and she has found many clients among her wealthy friends. She will probably be the next person in her line of business to undertake the building of houses.

Interior Decoration

Artificial Lighting and the Decorator's Relation to It

By C. WALTER TOZER

EVERY decorator has learned by experience the vital value of light effects, artificial or natural, upon a color scheme or upon the room proportion, or upon what, for want of a better term, we call the atmosphere of an apartment.

Every room in a house properly designed has been designed for a purpose. Many rooms are never used except when lighted artificially, and the problem, therefore, of light for its decorative as well as utilitarian value is one of great importance. Certain rooms, like the library, present the lighting problem from the utilitarian standpoint, other rooms call for glitter and glare, while still others call for a softly diffused light. This whole question of lighting is a very nice subject for study. Hence it will be seen that the decorator's province becomes broadened, day by day. Time was when the architect was supposed to be authoritative in the making and decorating of the house; but experience has proven upon more than one occasion that the architect's knowledge is architectural, and that in many cases he has not the experience, the training, nor the disposition to consider the furnishings or the interior decorations.

To better bring out the points involved under our heading we will quote some of the observations brought out at the first general meeting of the Illuminating Engineers' Society. L. B. Marks, the president, in his address observed:

"So far as interior illumination is concerned the lighting layout has been left largely to the architect. It is he who usually prescribes the number and location of outlets for the light sources, specifies the number and candle power of the lamps, and designs or selects the lighting fixtures and accessories. Very often these specifications are completed before the color scheme of the interior has been decided upon, with the result that the degree of illumination obtained may fall short of what is needed in cases of dark-colored interiors, or be excessive in the case of light-tinted rooms.

"The natural tendency of the architect is to make the economical side of illumination subservient to the aesthetic, while on the other hand the tendency of the engineer is to consider only the question of oconomy. It is an encouraging sign of the times that the architect and the engineer are gradually drawing closer together in dealing with problems involving both the scientific and the artistic side of illumination."

Of course the walls in an unfinished building are of themselves light reflectors, and a little light will go a great way. But the minute these walls have been treated by the decorator, and deep, rich, absorbent colors, which take up light so much, are introduced in the walls, carpets, furniture and curtains, we have light considerations far remote from those which confronted the architect and his bare walls. Another engineer observed:

Exterior of New Jerusalem Church, San Francisco
Page Brown, Architect

Interior of New Jerusalem Church, San Francisco
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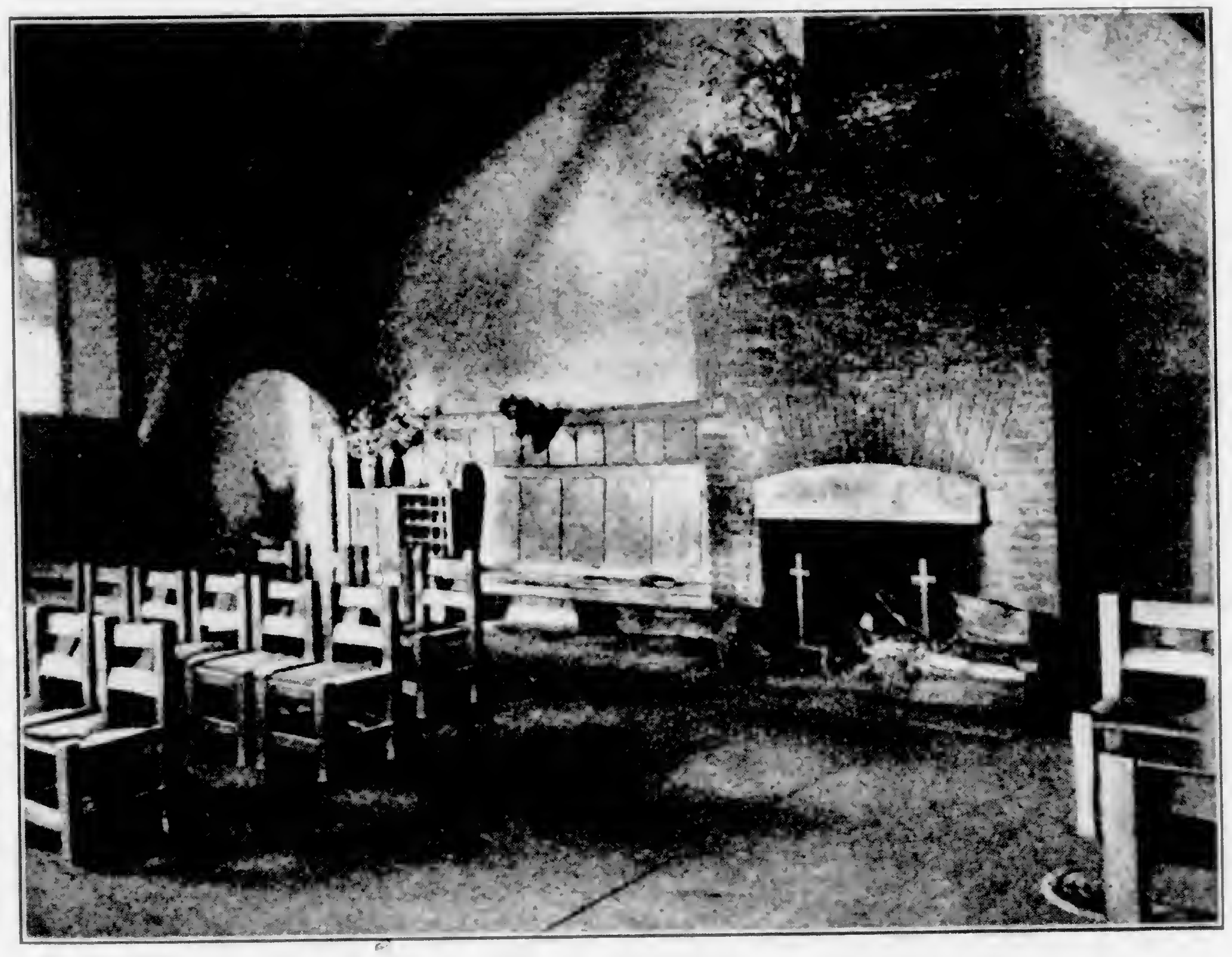
To better bring out the points involved under our heading we will quote some of the observations brought out at the first general meeting of the Illuminating Engineers' Society. L. B. Marks, the president, in his address observed:

"So far as interior illumination is concerned the lighting layout has been left largely to the architect. It is he who usually prescribes the number and location of outlets for the light sources, specifies the number and candle power of the lamps, and designs or selects the lighting fixtures and accessories. Very often these specifications are completed before the color scheme of the interior has been decided upon, with the result that the degree of illumination obtained may fall short of what is needed in cases of dark-colored interiors, or be excessive in the case of light-tinted rooms.

"The natural tendency of the architect is to make the economical side of illumination subservient to the aesthetic, while on the other hand the tendency of the engineer is to consider only the question of oconomy. It is an encouraging sign of the times that the architect and the engineer are gradually drawing closer together in dealing with problems involving both the scientific and the artistic side of illumination."

Of course the walls in an unfinished building are of themselves light reflectors, and a little light will go a great way. But the minute these walls have been treated by the decorator, and deep, rich, absorbent colors, which take up light so much, are introduced in the walls, carpets, furniture and curtains, we have light considerations far remote from those which confronted the architect and his bare walls. Another engineer observed:

Exterior of New Jerusalem Church, San Francisco
Page Brown, Architect



Interior of New Jerusalem Church, San Francisco
Page Brown, Architect

"The architect works from a certain basis, the decorator from another basis, the purchaser of gas and electric current works from still another basis, and it is the province of the illuminating engineer to harmonize all these and bring them together so that the total of their efforts shall lead to a result which will be satisfactory."

There is a wide field of usefulness for the illuminatig engineer in the field of interior decoration. Millions upon millions of dollars are being spent every year, and the results of labor, skill and direct money expenditures are stultified by bad lighting.

In certain decorative periods we are compelled to utilize the fixtures of the period, but it is no anachronism in art to abandon candles in the colonial room and adopt electricity. The decorative features of the chandeliers, sconces, and candelabra must be retained in certain apartments, for they contribute to the decorative character of the room; but we must advance with science and use the most convenient forms of lighting, and in such a manner that it will serve as a neutral influence upon the color.

* * *

San Francisco the Home of Mission Type of Furniture

THERE has been considerable discussion, from time to time, as to just who originated the "Mission" style and what occasioned its inception.

The real facts indicate without any question of a doubt that one of our own architects, Page Brown, designed the first examples of this now popular style. In fact we have these first examples right in our own San Francisco. It was in the little "New Jerusalem" church that the prototypes of all the "Mission" chairs were found. Page Brown was the architect of this church, and to carry out his unique scheme of the interior he designed the "Mission" chairs. From these Mr. Joseph P. McHugh, the New York decorator and furnisher, drew the inspiration that led to his creation of the "Mission" type of furniture.

In an article in the New York Evening Post of recent date a contributor says:

"Consider what an appreciative writer has said of one little church that stood far out toward the Presidio, near Jackson street. It was the little Swedenborgian church founded by Dr. Worcester: 'Within the stranger is impressed with a certain primitive quality about everything. The heavy madrono trunk rafters left in their natural state, the big open fireplace, the massive square-post, rush-bottom chairs, and the large, grave allegorical landscapes of seed time and harvest, painted with loving care by William Keith, combine with the simplicity of design and fitness of every detail to make a church which, without any straining after effect, is unique in beauty.' But this little refuge from the essential ugliness of San Francisco was by no means unique. As the same writer has pointed out, the message of the church's builder has reached its mark. Here and there through the city homes have been reared in the same simple fashion—plain straightforward, genuine homes, covered with unpainted shingles, or built of rough brick, with much natural redwood inside, in broad, unvarnished panels. The same reserve which has characterized the building of these homes has likewise been exercised in their furnishings. A few antique rugs, a few good pictures or photographs of the masters, and many good books, with plain tables and chairs, constitute the furniture. To find this spirit which would have been a delight to William Morris, so strongly rooted as to assume almost the aspect of a cult, is, I take it, one of the most remarkable features of a civilization so new as that of modern San Francisco."

Landscape Architecture

A Comparison of Planting Methods of Southern California and the East

By WILBUR DAVID COOK, Jr., Landscape Architect

YOU have asked me to tell in a general way how planting on our private estates in the East differs from that in Southern California.

I find little, if any, attempt made at border or massed plantations—very few broad expanses of sweeping lawn to lend dignity, repose and charm to the residence grounds. I know you are up against it on the water question but it isn't always going to be so.

If you will permit me to say so, I think too much attention is paid to the frame and too little to the picture. The eye is distracted by bright splotches of unharmonious colors in the foreground and the lawn areas broken up by too many specimen plants, all fine enough indeed, really, but more in keeping in a botanical garden.

Most of our estates are planted in rather a sombre style, running to symphonies of green in the foreground, with sweeping expanses of lawn framed or edged in with border plantations, with the high lights picked out ever so carefully to emphasize certain important details. Our border plantations are planned to form deep inlets and projecting tops for light and shade effect and by hiding existing boundaries, we add immensely to the apparent area. Our color effects are confined almost entirely to our primal gardens, thus affording a pleasing contrast of unending interest. This lack of repose and dignity I found the most noticeable feature in many of the estates in Pasadena.

I have in mind one estate which gave ample evidence of any amount of money being spent in securing lawn effects, but unfortunately the grounds had been terraced in formal slopes on what was naturally a beautiful side hill slope. Such existing trees as happened to be on the estate had been mounded up until they gave the impression of having been bodily pulled up part way and then abandoned to their fate. The general effect of this terracing is to give one the impression of a relief map. I have not noticed any systematic effort being made to screen out the harsh, hard lines of the house foundations where they meet the lawn.

Briefly summed up, I should say the principal points of difference are these: Where you strive for color effects we do not. Where you make an exhibition of individual specimens, we do not. Where we make a feature of the lawn, generally speaking, you do not. While we strive for effects as an entirety you strive for them individually, with a subsequent loss of dignity and repose. Where we make a feature of border plantations, you do not. Taken as a whole, I think our results are more pleasing. I must, however, in all fairness, say that your possibilities are practically unlimited. You can run the gamut of colors and you can grow many things that we cannot. You can secure effects which we cannot hope to equal.

Among the Architects

Oakland Builders' Exchange

The former rooms of the Builders' Exchange of Oakland are now conducted by the Master Builders' Exchange, of which D. S. Brehaut is president, Geo. C. Noll secretary and H. F. Staring acting secretary. The new officers are all well known and popular. The following announcement has been made in the form of circular letters addressed to all members:

"Your attention is called to the change in name and management of the Exchange at 425 Fifteenth street, Oakland, Cal., and you are cordially invited to continue your patronage as a box-renter or advertiser.

"Improvements in the service will be made as rapidly as possible, and if you have any suggestions to offer which may help those in charge to bring about desired results, please signify the nature thereof.

"Mr. H. F. Staring, in charge of the affairs of the Exchange for the Master Builders, is authorized to receive and receipt for moneys due the Master Builders' Exchange."

Labor Troubles

It seems a pity that San Francisco must face so many labor troubles at this critical season. The city can ill afford to have strikes on its hands to retard the very urgent building operations. Practically every branch of the building trade is receiving the benefit of unprecedented activity, and it is safe to say there is not a mechanic or laborer who is not receiving something over the union scale. Yet despite this liberality on the part of the capitalist serious interruptions of work have occurred. On August 20th about eighty-five hoisting engineers went on strike, and as a result work was suspended on as many buildings in this city, depriving several hundred mechanics in the building trades of work. The engineers demanded an increase of the minimum wage rate from $5 to $6 a day, which the employers declined to grant.

Bids for Concrete Bridge

Bids have been received by the Oakland Supervisors for the construction of a steel and concrete bridge on the county road leading from Oakland to San Leandro, from the end of the present bridge at the east line of Orchard avenue easterly to the lands of Richard Dowling in Brooklyn road district, Brooklyn township. The estimate of County Surveyor Prather as to the cost of the work was $16,499. The proposals offered were as follows: Healy-Tibbitts Construction Company, $21,000; Cotton Bros. & Co., $16,215; Burrell Construction Co., $16,240; E. B. & A. L. Stone, $16,254; New Era Construction Company, $17,833; Dunlevy & Lynch, $17,290.

The bids were referred to the county expert.

Personal Mention

Mr. Wilbur David Cook, landscape architect, is laying out a tract of land containing about 3000 acres between Sherman and Sawtell. Part of the tract includes the foothills known as the Beverley Hills, which present many difficult and interesting problems to combine both beauty and utility. A decided departure is to be made from the usual conventional lines. The plans and work, now in progress, indicate that an exceptionally harmonious and pleasing effect on broad lines will be accomplished.

To Use Roman Stone

Bids are shortly to be taken for the erection of the Luning Building, Geo. Fife owner, at the gore of Market and Drumm streets. E. J. Vogel is the architect and Couchot & O'Shaughnessy are the concrete engineers. It has been decided to make the first story and window frames of Roman stone, the remaining ten stories being reinforced concrete. The frame work will be of steel. The structure is to cost $400,000.

Hot Water, Steam Heat

A circulating hot water plant to supply 96 offices with hot water will be a feature of a seven-story reinforced concrete building to be erected at Montgomery and Sacramento streets by R. V. Kazian and William Mooser. A steam heating plant will be included. Two passenger elevators will be installed. The building will cost $125,000.

New Y. M. C. A. Building

Five hundred thousand dollars have been subscribed for the new Y. M. C. A. building. Secretary McCoy said that the building to be erected will be one of the finest in the world. The building committee has not yet been selected, but work will be begun just as soon as conditions warrant. It has not been decided whether the new building will stand on the old site or not, but it is certain that it will be as comfortable and serviceable as $500,000 expenditure can make it.

Contract Goes to Mahoney Bros.

Mahoney Bros. have taken the contract for the erection of the Magee office building, recently surrendered by the Fuller Construction Company. The plans are by Bliss & Faville, and call for a 12-story building of pressed brick and terra cotta.

Mahoney Bros. have established temporary quarters in the St. Francis hotel.

Pacific Mutual to Build

The Pacific Mutual Life Insurance Company is ready to receive bids for wrecking its seven story building at the corner of Sansome and California streets. As soon as the debris has been cleared a modern eight or ten story office building will be erected.

Hotel at Berkeley

Bids are now being taken by Architect C. M. Cook, of 1003½ Broadway, Oakland, for a five story hotel to be built by J. A. Marshall. There will be 200 rooms. A roof garden will be a feature of the building. An up-to-date hot water heating system will be installed.

Oakland Cottages

Architect Newsom of Oakland has plans for seven cottages to be built at Fiftieth and Dover streets, Oakland, for William Keifer. The cottages will cost $1800 each.

BUILDING REPORTS

Six-story pressed brick building, southwest corner of Mission and Second streets.
Owners—J. S. Morgan & Son.
Architect—E. J. Vogel.
Cost—$100,000.

This building will be of handsome pressed brick with a stone entrance and vestibule. It will be a Class B structure and will contain two fast running elevators. The cornice will be of terra cotta. The building will be used for stores and lofts.

Bank Building, Montgomery and Clay streets, San Francisco.
Owner—Bank of Italy (now in the Montgomery Block).
Cost—From $100,000 to $200,000.

Competitive plans have been submitted to the bank officials for a building to be seven or eight stories high, either of brick and terra cotta or reinforced concrete, and containing banking quarters on the ground floor and offices above.

College building, Fourteenth street, near Jessie, San Francisco.
Owner—College of Physicians and Surgeons.
Architect—E. F. Young.
Cost—$50,000.

Work on this structure will be started at once. It will be of concrete and three stories high.

Four-story reinforced concrete building, Pine and Front streets, San Francisco.
Owner—Charles A. Son.
Architect—Clinton Day.
Cost—$50,000.

This building will be one of the handsomest in design that has yet been planned of reinforced concrete. There will be a bank on the ground floor and offices above. The size of the lot is 92x60 feet. The building will have attractive ornamentation.

Temporary structure for Paulist Fathers, on site of old residence, California street, near Dupont, San Francisco.
Owner—Paulist Fathers.
Architects—Welsh, Cary & Welsh.
Cost—$5,000.

A frame structure with a seating capacity of 600 is now in course of erection.

School building, Fell and Fillmore streets, San Francisco.
Owner—Christian Brothers.
Architects—Welsh, Cary & Welsh.
Cost—$14,000.

This frame building will be directly in the rear of the Sacred Heart Church, and will be built on a concrete foundation and classic design to harmonize with the church. There will be twelve classrooms.

Eight-story office building, San Francisco.
Owner—Mr. Lunning.
Architect—Nathaniel Blaisdell, 3243 Washington street.
Cost—$125,000.

This building will be a Class A, steel frame, pressed brick and terra cotta office building. There will be a high speed elevator, tile and marble entrance, etc. Bids are now being taken.

Two-story building, East street, between Mission and Howard streets, San Francisco.

Owners—Barneson & Hibberd.
Architects—O'Brien & Werner.
Cost—$60,000.

This building, which has been previously referred to, will cover 30,000 square feet, and will contain 100 offices and 24 stores. The structure will be known as the "Maritime Building."

Four-story brick building, Eighth and Howard streets, San Francisco.

Owner—Henry F. Bothin.
Architect—Frank Van Trees.
Cost—$60,000.

This building will be of brick with plastered exterior and hard wood interior finish. There will be five stores and 60 rooms. The entrance will have tile floors. The bay windows and cornice will be of metal and galvanized iron.

Two-story Class B building, Market near Kearny street, San Francisco.

Owners—Speck & Co., real estate agents.
Architects—Meyer & O'Brien.
Cost—$15,000.

The building will be after the mission style of architecture, two stories with plate glass and green marble. The first floor will have a 20-foot ceiling with a balcony. There will be offices on the second floor. Bronze ornaments will make the exterior attractive.

Apartment houses—Jackson street, near Leavenworth.

Owners—Drs. Clyde and Redmond Payne.
Architect—W. G. Hind.
Cost—$82,000.

There will be three buildings of frame construction and modern improvements, including steam heat and elevators There will be a total of 64 apartments of three, four, five and seven rooms each.

Fireproof office building, Pine and Leidesdorff streets, San Francisco.

Owner—Edward W. Hopkins.
Architect—S. H. Woodruff.
Contractors — Woodruff Construction Company.
Cost—$125,000.

This structure will be seven stories high, and a remarkable feature of its construction will be the absence of wood in its construction. The exterior will be of reinforced concrete, the window glass molded over steel wire net and the window sashes and door frames of bronze. The floors will be of marble, interior finishings of steel "mahogany," and there will be a heating and ventilating system installed so that the air may be changed every second.

Five-story brick apartment house, southeast corner of Post and Polk streets, San Francisco.

Owner—O. D. Baldwin.
Architects—Ross and Burgin, Bush and Laguna streets, San Francisco.
Cost—$80,000.

The foundations for this building are now being built. The general contract has not been let. The building will be five stories and will contain an up-to-date steam heating plant, tile bath rooms, marble and mosaic entrance and vestibule, dumb waiters, etc.

Five-story office building, north side of Eddy street, adjoining the old Poodle Dog restaurant.

Owner—Joseph estate.
Architects—Ross and Burgin.
Cost—$45,000.

This building will be Class B, of buff pressed brick and terra cotta; steam heat, elevator, metal window and door frames, etc.

Church, Duboce ave., near Noe street, San Francisco.

Owner—First Christian Church.
Architects—Ross and Burgin.
Cost—$35,000.

This edifice, for which plans are now being made will be of brick with plastered exterior, and will have a tile roof and a seating capacity of about 600. There will be stained glass windows.

Three-story flats, south side of McAllister street, near Laguna street, San Francisco.

Owner—Mrs. John Hayes.
Architects—Welsh, Cary & Welsh, 40 Haight street.
Cost—$10,000.

The building will be frame and in every way up to date.

Two-story building, Post and Market streets, San Francisco.

Owner—Lyon & Hoag, real estate agents.
Architect—J. F. Dunn.
Cost—$30,000.

The building will contain twenty-four offices and five stores. The facade on the Post street side will be in the French renaissance, and will be treated as a colonnade, which will permit of the use of much glass and metal between the columns. The exterior will be of brick.

Two-story store and office building, Van Ness Avenue, near Grove street.

Owners—Walsh & Prichard.
Architects—Rousseau & Son.
Cost—$40,000.

The building will be of brick and terra cotta; equipped with plate glass front and prismatic windows. There will be eleven stores and seventy-two offices. A vacuum cleaning equipment will be installed in each room, and the entire building will be modern in every respect.

Factory building, Valencia and Brosnan streets, San Francisco.

Owners—Levi Strauss & Co.
Architect—Albert Pissis.
Cost—$100,000.

The building will be three stories high and will contain over 100,000 square feet and give employment to 1500. A private electric light, heating and motive power plant will be installed.

Robinson & Gillespie have been given the contract, which calls for the completion of the building in ninety days.

Three-story hotel and store building, Post street, near Fillmore, San Francisco.

Owners—W. Baron and Alex. Mann.
Architect—W. W. Gates, 994 Haight st.
Cost—$32,000.

This building will be of concrete, the ground floor, covering 4000 square feet, will have a restaurant, and there will also be several modern stores, with sixty rooms overhead for hotel purposes.

Residence, Van Ness avenue and Clay street, San Francisco.

Owner—Claus Spreckels.
Architects—Reid Bros.
Cost—$800,000.

The magnificent Spreckels mansion which was wrecked by the fire is to be restored in all its grandeur, and the architects are now busy with the plans. The structure is to be of stone and marble.

Stores and offices, East street, between Mission and Howard, San Francisco.

Owner—Maritime Realty Co., J. Barneson, president.
Architects—O'Brien & Werner.
Cost—$110,000.

This building will cover a lot 230x137 feet and will be of brick and steel, and two stories. There will be 24 stores and 100 modern offices. It is estimated that the building can be completed in four months.

Bank building, Mission and Sixteenth streets, San Francisco.

Owner—Anglo Improvement Company.
Architect—Sylvain Schnaittacher.
Cost—$55,000.

The building wlll be four stories and will be occupied by the Anglo-Californian Bank, the ground floor being especially fitted up for that institution. There will be 42 offices above.

Warehouse, southwest corner of Front and Jackson streets, San Francisco.

Owner—O'Sullivan Estate.
Architect—Houghton Sawyer.
Cost—$30,000.

Work has already started on this building, which will cover a lot 92x137 feet and will be one story, having a clear height of 24 feet with a gallery for storage goods and a freight elevator. The private offices of the firm will be very handsomely finished in paneled work.

Apartment house, northeast corner of Hyde and Lynch streets, San Francisco.

Owner—F. J. Young.
Architect—C. H. Barrett.
Cost—$75,000.

There will be 26 apartments of two, three and four room suites, finished in natural woods and provided with gas ranges, patent beds, etc. An automatic elevator will be a feature of the building.

Hotel, Sutter and Hyde streets, San Francisco.

Owner—Dr. Julius Rosenstirn.
Cost—$200,000.

The new building will be seven stories, Class A, of reinforced concrete, and the grill room will be one of the most elaborately decorated in the city. There will be 200 rooms. Dr. Rosenstirn's agents are Harrington, Weidenmuller and Rosenstirn.

Three story building, Powell and O'Farrell streets, San Francisco.

Owner—Mrs. Minifie.
Architects—Salfield and Kohlberg.
Cost—$25,000.

Work has started on this building, which will be of brick and stone and Spanish design. The structure will contain stores and offices.

Two story warehouse, northeast corner of Brannan street and Boardman place, San Francisco.

Owner—Henry E. Bothin.
Architect—Frank Van Trees.
Cost—$30,000.

This building will follow the Mission style of architecture. Concrete with tile roof will be used.

Apartments, Bush street near Powell, San Francisco.

Owner—Mrs. L. M. Bigelow.
Architect—J. Cather Newsome.
Cost—$80,000.

This building will be eight stories high, built either of brick or concrete, and will contain apartments in every way up to date.

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OWNER TO BLAME FOR POOR BUILDINGS

One of the most prominent architects in San Francisco said the other day that the city is going back to just where it was before the fire, architecturally speaking. It hurts to make public this declaration, but if another calamity is to be avoided, now is the time to guard against it. By his statement, "going back where it was before the fire," the architect had in mind the position of the owner who wants a fire-proof building, but isn't willing to pay for fire-proof material. Right after the fire no less than half a dozen property owners whose buildings were destroyed talked to this architect about rebuilding. Each one expressed himself very emphatically in favor of sparing no expense in erecting structures that would not only stand a possible repetition of mother earth's disturbances, but would resist the fire demon as well.

"We can build you a fire-proof building if you are willing to pay for one," was the cheering information of the architect, but ere the ashes of the April conflagration had cooled the owner had changed his mind and his reply to the architect in this case, as in scores of others, has been:

"Too much money. Better cut down the expense and make the building as near fireproof as you can without too much outlay."

The architect surely did his part in trying to encourage good construction. If what he designs and builds fails, the owner, under the circumstances, is the one to blame. He is the real culprit.

* * *

NATURAL STONE WON'T STAND HEAT

What a failure granite, stone and marble have been from a fire-resistive standpoint Stone, especially, has proved its utter worthlessness, and it is safe to say architects will, in future, refrain from using it in places where fire can reach it. The stone crumbles and breaks off as soon as it becomes heated, leaving the building with which it is faced or trimmed a sorry spectacle. Only a few days ago a portion of a Colusa stone pilaster on a new San Jose building crumbled and cracked most distressingly through being heated by a fire in an adjoining stable.

* * *

DON'T STANDARDIZE CONCRETE

With the advent of reinforced concrete construction in San Francisco, has come the suggestion by many architects that the design of the material be standardized, as in the case of steel. Such a condition would, of course, be extremely valuable and a great time-saver, but the difficulties attendant upon such a procedure present themselves in great number to anyone familiar with the principles of reinforced concrete design. Much of the danger arises from the shearing condition and it is absolutely essential that he who would safely design reinforced concrete structures have a good knowledge of mechanics.

It is not enough to know that a beam of given dimensions with a given area of steel in the flange will carry a given uniform load or a given load concentrated at the center. The reinforcement is worthless unless it is properly placed and takes care of the shearing condition.

Take, for example, the case of a beam with a given span, simply supported at the ends and carrying at the center a heavy concentrated load. In steel, we double the load, consider it uniform, and obtain the necessary beam from a hand-book. Assuming that we had a similar hand-book on reinforced concrete, we would come to grief were we to use it in like manner without further provision for safety.

The foregoing is but one of numberless conditions of the same character, all of which go to prove that reinforced concrete design requires a knowledge of the fundamental principles of the mechanics of materials.

Material for Rebuilding

Surveyor of the Port Woodward calls attention to the large fleet of ships bound to this port with heavy cargoes of building material and those that are preparing to sail for here. The list is as follows:

From Antwerp, four steamers and thirteen sailing vessels have sailed, and one steamer and eight sailing vessels are on the berth; Bremen, one vessel has sailed; Calcutta, one steamer has sailed; Genoa, two vessels have sailed; Hamburg, eight steamers and eight vessels sailed, and three vessels are on the berth; Hull, two vessels have sailed; Liverpool, two vessels and one on the berth; London, three steamers sailed, five sailing vessels cleared and two on the berth; Newcastle, four vessels sailed, one on berth; Rotterdam, five vessels sailed, one on berth. This makes a total of sixty vessels and seventeen steamers. There are thirty-two vessels on the way from other ports, not including Oriental ports, whence there will be a heavy traffic.

These 109 vessels have on board 213,000 tons of cargo, mostly structural steel for the rebuilding of San Francisco, including 300,000 barrels of cement, the duty on which will be nearly $100,000. There have already arrived here 65,409 barrels of cement, the duty on which is $23,832.88.

* * *

Developing the West

The rush of settlers westward has increased the traffic on all western lines, especially those to the Far West and Pacific Coast. This means additional equipment to handle freight and passengers.

For the year 1906, the Southern Pacific Company has ordered 60 chair cars, 10 baggage cars and six diners—three of these diners being for the Southern Pacific Company and three for the Central Pacific.

There has also been ordered for the freight department 1250 box cars, of which 750 are for the use of Southern Pacific and 500 for Central Pacific; 100 flat cars, of which 60 are for the Southern Pacific and 40 for the Central Pacific; for handling meats and fruits they have ordered 300 refrigerator cars, 150 for the Southern Pacific and 100 for the Central Pacific.

In addition to the above orders, there have been ordered 11 of the Atlantic type locomotives, and six of the Pacific type; also 32 consolidation locomotives and 23 switch locomotives. Of the above locomotives, the Southern Pacific will use nine of the Atlantic, six of the Pacific, 16 of the consolidation. and 16 switchers, the balance to be used by the Central Pacific.—Sunset Magazine for August.

The Publisher's Corner

Western Iron Works Plant. One of the First to Resume Business After the Fire

Enterprising—The Western Iron Works

Few San Francisco industries have displayed greater enterprise since the big fire than the Western Iron Works, one of the pioneer steel industries on the Pacific Coast. When the conflagration swept away this company's plant its shops were running day and night in an endeavor to keep up with orders. Plans for enlarging its plant had for some time been under consideration. The fire came and, of course, took everything in its path. The president and manager, W. B. Morris, realized that if the old shop was not large enough to handle the business of the company before the fire, nothing short of a building twice the size of the one burned would suffice after the disaster, for if there is any one kind of building material now in demand more than another it is steel and iron. So the new home of the Western Iron Works was not only doubled in size, but tripled, and even with the added room thus provided the problem of taking care of the tremendous increase of business is one not easily solved.

The Western Iron Works first began business in San Francisco back in 1852, at which time the late John R. Simms was its ruling spirit. In 1889 the company was incorporated, with W. B. Morris as president and manager; H. M. Wright, vice-president, and L. I. Gates secretary. Its shops for years have been on Beale street. Immediately after the fire a lot 20x60, on the west side of Main street, south from Mission, and extending through to Beale street, was purchased, which gave the company altogether three lots, each 45x 137 feet, upon which was erected a mammoth corrugated iron building, triple the size of the old structure. New machinery was installed, and to-day the Western Iron Works can honestly boast of having one of the largest and best equipped structural iron and steel shops in San Francisco. It was the Western Iron Works, by the way, that was first to establish an office in the burned district after the fire. On April 28, just ten days after the disaster, the company was comfortably housed in its then palatial office—a building that will pass into history as a typical illustration of California loyalty and business enterprise. Among the large orders which the company is now filling is one for the Schilling Company, consisting of all the structural steel and iron work for this concern's new factory buildings.

Interior of Western Iron Works Mammoth Machine Shop

* * *

Low Rates to Bring Labor West

The passenger department of the Santa Fe and Southern Pacific companies announce that, in view of the great demand in California for labor, it has been decided to put into effect low one-way rates from all points east.

From Chicago the fare will be $33; from St. Louis, $31; from Omaha and Kansas City, $25; from New Orleans, $31; from points in Indian Territory, Kansas and Nebraska, $25; from New York, $50, and corresponding rates from other points. They will remain in effect until the end of October.

There never was such a demand for labor in the history of California. Thirty thousand men, women and children are needed to gather the immense crops of hops, grapes, prunes and other fruits, and sugar beets. The men in the lumber industry can employ twice the present number in the pine forests of the Sierra Nevadas and the redwood forests of the Coast Range. The railroad companies want 15,000 men for railway construction with at least a year's work.

In the rebuilding of San Francisco thousands of carpenters, bricklayers, plumbers, and in fact all classes of skilled labor are badly needed. And this need will increase as fast as the architects and ground owners can get plans ready for the steel frame buildings that are going up; over one hundred and fifty of which have already been planned.

* * *

Mr. A. Breslauer, one of the best known cement importers of the Coast, reports sales as excellent, his only annoyance being the apparent effort to confound the well known Lion Brand, which is standard in every particular, with some of the inferior grades of cement bearing names sufficiently new to be misleading. Lion Brand of cement is made and sold on honor, meets every requirement and stands every test required of a strictly first-class Portland cement.

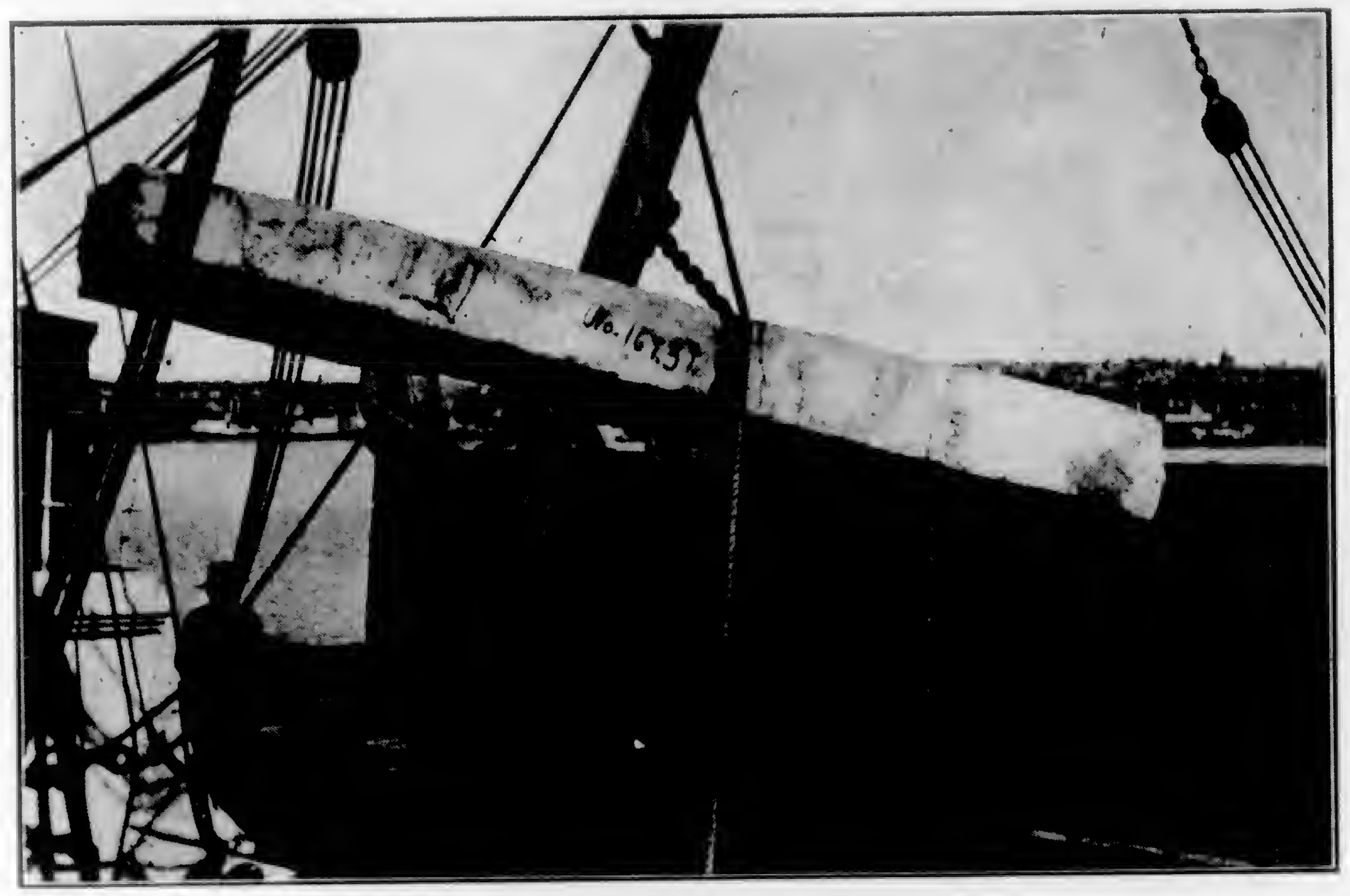
* * *

The New Peninsula Onyx

The New Pedrara Mexican Onyx Company, which has opened a branch office in Room 48, Bacon Block, Oakland, with Mr. Lew C. Black in charge, will make a strong bid for the interior finish and fixtures of the finer buildings in San Francisco and on the coast in general.

The company owns 5000 acres of land in Lower California, about two hundred miles south of San Diego, on which is located the largest deposit of the finest onyx known in the world today. The supply is practically inexhaustible, and they can furnish this beautiful onyx in as large blocks or slabs as it is possible to handle.

Up to the present time the stone has been used almost exclusively in the manufacture of soda fountains. The company is now supplying about 10,000 cubic feet a year to eastern manufacturers of this class of goods, and the fact that Peninsula Onyx is used in practically every onyx soda fountain produced in the United States today is a very great testimonial for its beauty and quality. The company has shipped sixteen carloads so far this year. The sales are continually increasing, and notwithstanding the fact that the company is working thirty men at the quarries it is having difficulty getting out the stone



Lifting a Piece of Onyx

fast enough, and plans are under way to put in additional up-to-date machinery besides increasing their working force.

One of the beauties of the Peninsula Onyx is the fact that although the stone can be selected to match in coloring, every slab is a study in itself, as no two are marked exactly alike. The marking and coloring of this stone is one of the many works of nature that cannot be imitated or equaled in beauty by the hand of man.

The first cut shown herewith will give the reader an idea as to the thickness of the ledges and the way it is found at the quarries, while the second illustration shows the onyx being transferred from the ship to the cars at San Diego. This particular block was 14 inches thick, 4 feet wide and 16 feet long, contained about 75 cubic feet and weighed 13,500 pounds, or 6¾ tons.

Onyx Quarry

Interlocking Stone Company

The Interlocking Stone Company was recently incorporated under the laws of California, for the purpose of manufacturing patented, reinforced interlocking blocks for buildings of all descriptions. In a circular recently issued the company states:

"It is gratifying to note the rapid development of the concrete building blocks in the United States. The cement block displaces about thirty bricks and a much greater number of cubic feet per hour or day can be laid with hollow blocks than with brick. The block, being hollow, saves material, at the same time producing a more desirable form of construction, making the building warmer in winter and cooler in summer.

"The fire-proofing properties of concrete is another claim which is appreciated by owners of buildings, as insurance rates are thereby reduced.

"Our reinforced interlocking blocks are the only actual interlocking blocks in the market, both economical and durable, combined with an attractive finish for the outside, while the inside is plain and smooth, and can be moulded to any design. Each wall is composed of an outer and inner parallel face. Our blocks are reinforced with steel as they are moulded and again reinforced and interlocked when the blocks are set in place.

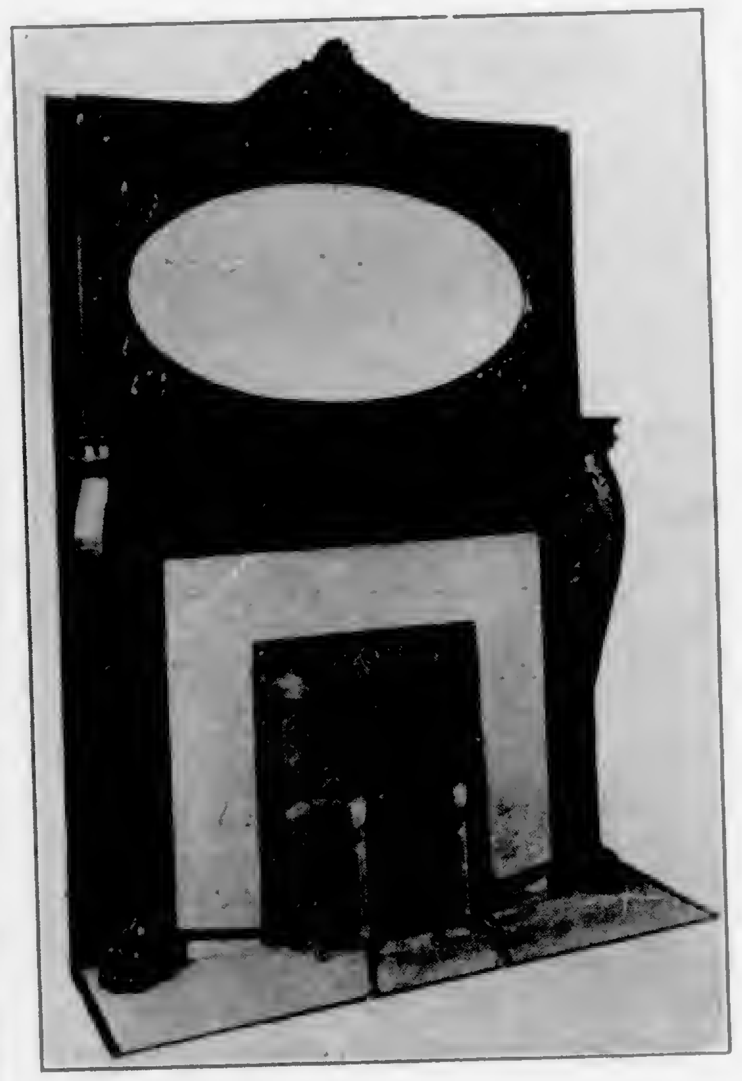
"Each interlocking stone is moulded with dove-tail shaped keys at the rate of one-eighth to each inch, which rest upon one another, thus utilizing its own weight to fortify construction.

"Mr. G. A. Peterson, the manager of the Interlocking Stone Company, personally superintended the erection of the Wempe building, corner Fifth and Adeline streets, Oakland, Cal., which is made of concrete blocks, on made ground, formerly a swamp. No other known building stood the test of the earthquake better than this one. The proprietors of the Schmidt Lithograph Company examined the building three days after the late quake, and were so pleased with its solidity and perfect condition that they immediately purchased the property.

"The company has set aside a limited number of shares of the capital stock, to be sold for the purpose of enlarging the business and erecting a plant, in order to manufacture our interlocking stone on a more profitable basis, as the orders for building blocks are coming in fast."

The officers and directors are: J. G. Niggle, president; F. V. Schiller, vice-president; G. A. Peterson, manager; D. O. Wallace, director; A. Weimann, secretary and treasurer.

The company's offices are at 563 Ninth street, Oakland.



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Fire Place Fixtures
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Tile Floors . . . . . .

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Fire-Proof Brick

The following from the Monterey Daily Cypress of July 14 will interest brick men in particular and the building trade in general:

"That the Monterey sand-lime brick is fire-proof is illustrated by one now on exhibition at the First National bank in this city.

"This particular brick was subjected to an intense heat in a furnace at the brick works at Seaside for two days. So hot was the heat that a piece of cast iron was melted, and the iron ran down and fused with the brick. The brick shows no sign of the fire except being roughened a little and glazed.

"The iron and brick are cemented together by the intense heat so strongly that they can not be separated.

"Fire brick in the furnace, where the sand-lime brick was, were twisted and warped under the heat. The sand-lime product is used in the place of fire brick in some of the furnaces.

"The brick on exhibition proves there would be no danger of a sand-lime brick and steel structure crumbling under the hottest fire, for the heat would merely braze the brick and steel together. It proves that besides being the best building material it is also absolutely fireproof."

W. F. Barnes, president of the W. F. Barnes Commercial Company of San

Steel Frames For Fireproof Buildings

Architectural and Ornamental Iron Work of All Descriptions . . . .

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Francisco and one of the leading promoters on the coast of the Schwartz system for the manufacture of sand-lime brick, adds to the above the following information:

"This test was not an intentional one as the lime kiln was faced with fire brick and the background was made of sand-lime brick, but the iron bars put in to support the lime rock would not stand the intense heat and fell in, and in doing so tore down the wall, thereby mixing up the sand-lime brick and fire brick, and it seems that the sand-lime brick coming in contact with the iron produced a result as described in the paper. It certainly is good evidence that sand-lime brick is quite as good as a good deal of the fire brick that is put upon the market.

"These sand-lime brick were made by the Schwarz System Brick Company's process, which is owned by the Monterey Brick & Stone Company of Seaside, California, and anyone desiring to correspond with them in reference to this matter can do so."

* * *

Make Blue Prints

During the last month, the Occidental Blue Print Company, a corporation, began business at 509 Golden Gate avenue, San Francisco, with facilities for rapid work at low rates. The company is preparing to operate an approved type of the Federal Continuous Blue Printing Machine, and will guarantee acceptable work. Phone, Special 1556.

STAR
Cement Laundry Trays

We sell our Trays under guarantee. They are made from the Highest Grade Materials and are Superior to any on the Market, both in Strength and Finish

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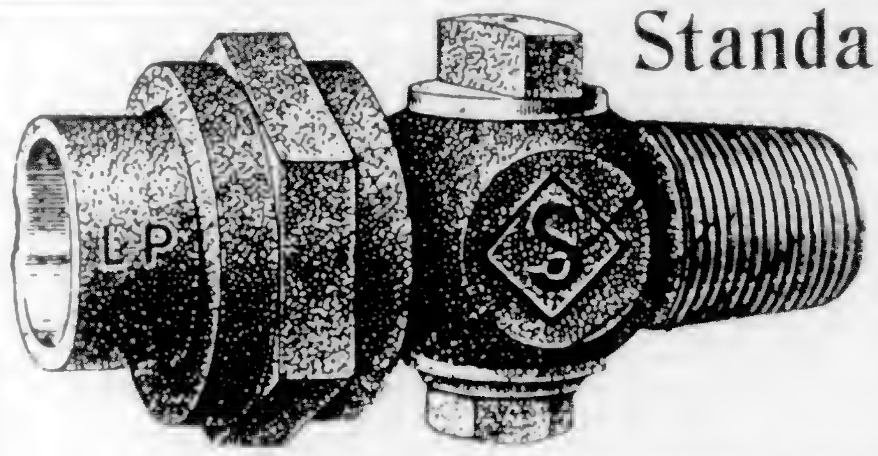

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MANUFACTURERS OF
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S. F. Office With GREAT WESTERN SMELTING AND REFINING COMPANY
Spear and Folsom Sts., San Francisco
Foundry, Oakland

* * *

Santa Rosa Rebuilding

Santa Rosa is making rapid strides in recovering from damage done to the city's buildings by the earthquake and fire. Nearly $1,000,000 worth of new work is under contract in that city and much of it is Class A work. Among the firms that are getting their share of the new business are Hoyt Bros., general contractors. The firm is building a beautiful stone and shingle church in Cloverdale for the Congregational Society, which will be one of the finest edifices in northern California.

* * *

Eight Pertinent Facts About the Grinnell Automatic Fire Sprinkler

1. Over 100,000 buildings in every part of the world are protected by the "Grinnells."

2. Over five thousand fires have been successfully extinguished by the Grinnell Sprinklers, with an average loss of less than $250, while same class of property not sprinkled the average loss has been $8000.

3. The Grinnell Sprinkler is opened

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Portland
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and other standard brands in stock and now on passage

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San Francisco, Cal.

automatically by the heat of the fire, and confines damage, whether by fire or water, to a limited area and minimum amount.

4. The Grinnell Sprinkler has rendered it possible (depending upon the character of the property) to reduce the cost of insurance 25 per cent to 60 per cent, and with a large pecuniary gain to insurance companies.

5. The saving thus effected in the cost of insurance soon pays for the sprinkler equipment.

6. The Grinnell Sprinkler is recognized by all insurance companies as the most reliable protection against fire losses, and it is the best possible security against interruption to a prosperous business, often more serious than the actual fire loss.

7. All modern appliances for extinguishing fires aim at promptness at the point of danger. A pail of water at the beginning will extinguish any fire, provided the pail of water is there, and some one to use it.

8. The Grinnell Sprinkler is itself the first pail, **but it requires no human agency to operate it.** It is on duty night and day.

The company's San Francisco agent is the Pacific Fire Extinguisher Co., 145 Howard street.

A Good Roof

W. & P. stands for Watson and Prutzman, the two men whose combined efforts have won a reputation for the products of the Pacific Refining and Roofing Company, the roofing department of which has recently been taken over and is now controlled exclusively by Mr. W. J. Watson, with offices at 314 Octavia street.

Mr. Watson is the inventor and discoverer of most of the processes and products of the company. He has been engaged in this same business for almost forty years, having established his first plant in 1867, at Erie, the center of that great manufacturing district of Western Pennsylvania and New York. Mr. Wat-

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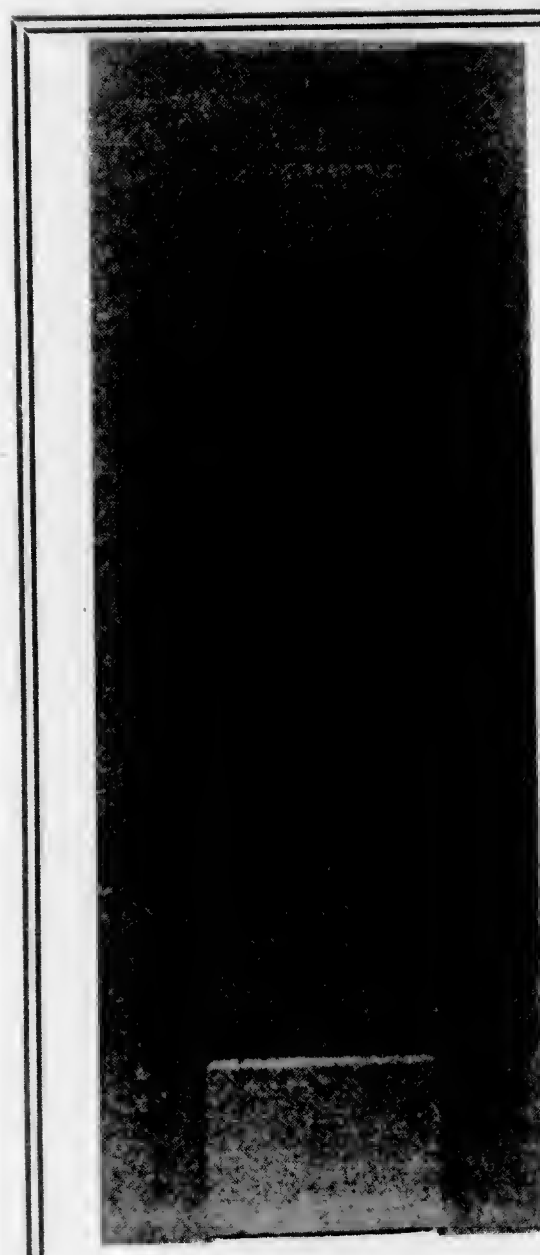

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ANGLE LAMPS

NO SMOKE NO ODOR LITTLE HEAT

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As Easy to Operate as Gas or Electricity—and better than either.

Lighted and Extinguished like Gas. Can be Burned High or Low without a trace of odor. Gives a Brilliant, Soft, Steady Light. A good light is the greatest pleasure and the first necessity of every home.

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son afterwards established plants at Louisville, Kentucky, and at Nashville and Memphis, Tennessee.

W. & P. roofing is a felt made of woolen rags and saturated with coal tar—a close-woven substance entirely waterproof. This is laid shingling on the roof boards, with laps of two-thirds if three-ply and three-fourths if four-ply, and as laid the successive laps are cemented together with the distilled pitch of coal tar.

When the felt is so laid it forms one solid sheet over the whole roof surface, independent of roof boards and **without a nail to work loose or a joint to open or leak.**

The felt is run up the fire walls and around all skylights and other openings, and is then flashed and counter-flashed with galvanized iron. After this is done the whole roof is flooded with a heavy coat of the pitch, into which, while the same is still hot and liquid, a complete covering of clean washed gravel of small and uniform size is imbedded.

It is a roof **without a seam or joint**, and therefore not subject to leaks; not fastened to roof boards except at sides of building, and thus unaffected by shrinkage of boards and timbers, impervious to dampness, and therefore not subject to rust or decay; unaffected by salt air, fumes or gases. And these are the requisites of a good roof for use anywhere and everywhere.

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Have resumed business at the old stand

35 Market Street
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Mar. 3, '02	$ 387,728.70
Sept. 15, '02	1,374,983.43
Mar. 15, '03	2,232,582.94
Sept. 15, '03	2,629,113.39
Mar. 15, '04	3,586,912.31
Sept. 15, '04	3,825,471.71
Mar. 15, '05	4,349,427.92
Sept. 15, '05	4,938,629.05
Mar. 15, '06	5,998,431.52
June 18, '06	**6,650,555.84**

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For Sale by all dealers.

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Mr. O. S. Sarsi has closed the contract to restore the architectural terra cotta in the immense light court of the James Flood Building. The work will be done with ornamental concrete stone. He has also closed the contract for the restoration of the terra cotta ornamentation on the front of the Telephone Building. This will be done in ornamental concrete stone also. The T. V. Galassei Mosaic Company are associated with him in these contracts.

Since the fire the C. A. Westcott Paint Company of 150 East street has had its business practically doubled. Mr. Westcott has given personal attention to the business and the result is the firm has been getting the cream of the water front work. Mr. Westcott has done all the mail dock work since the fire, and has painted both of the big sheds that were saved. All the new boats, including the Yosemite, Quinault and Svea, have been painted by him. There are few, indeed, of the big contractors for whom Mr. Westcott has not done more or less work of late. Most of the railroad, bridge, structural and boat work has been coming to him without the asking. Some idea of the volume of work done by this firm may be had when it is stated that Mr. Westcott has been doing all the painting for Mr. Spreckels, who owns a big fleet of tug boats, as well as the painting for the Healy-Tibbets Construction Company.

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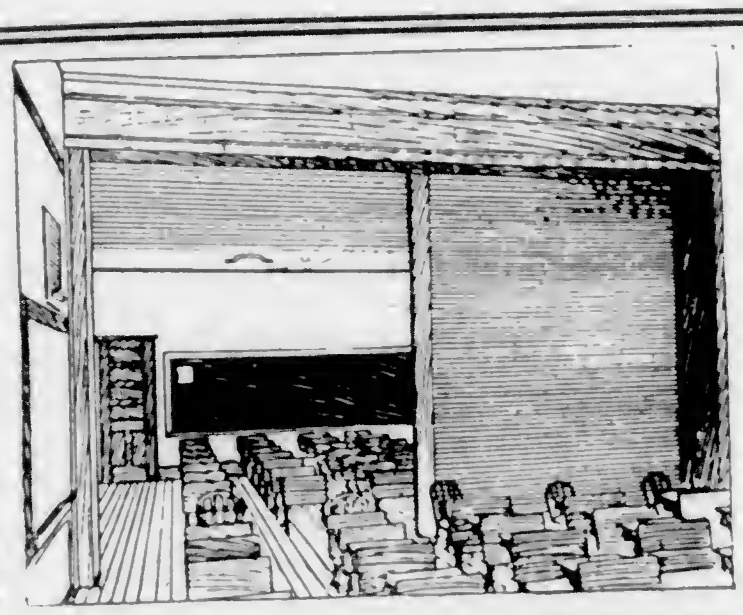

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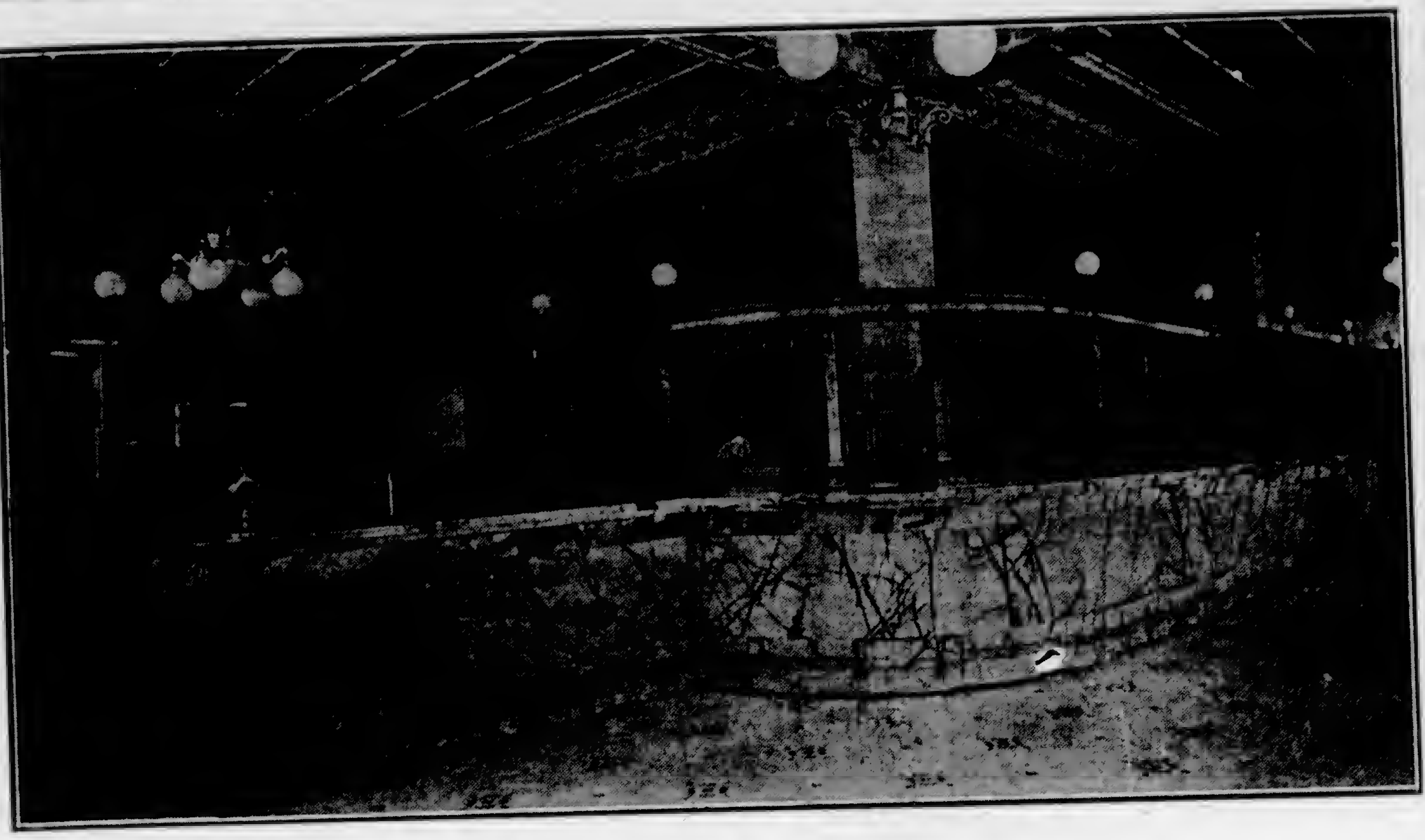

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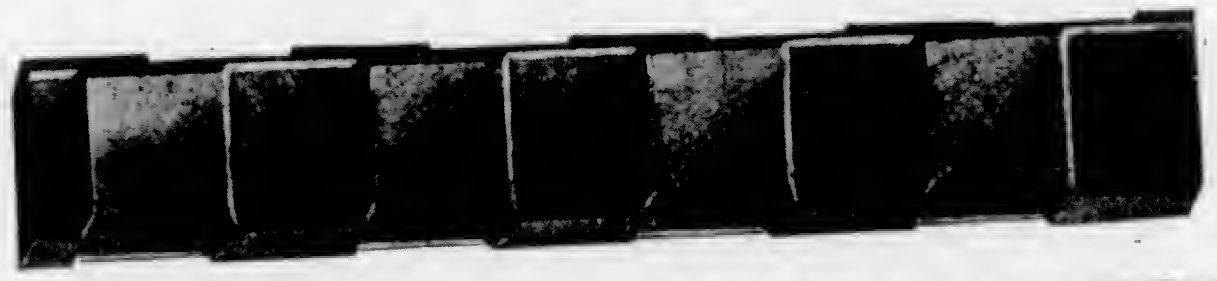

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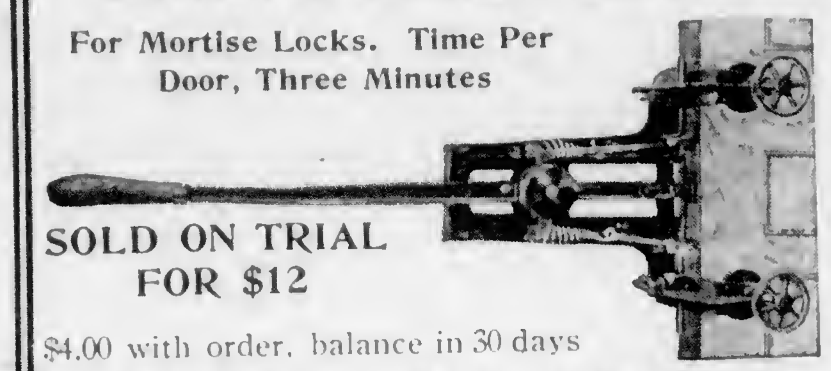

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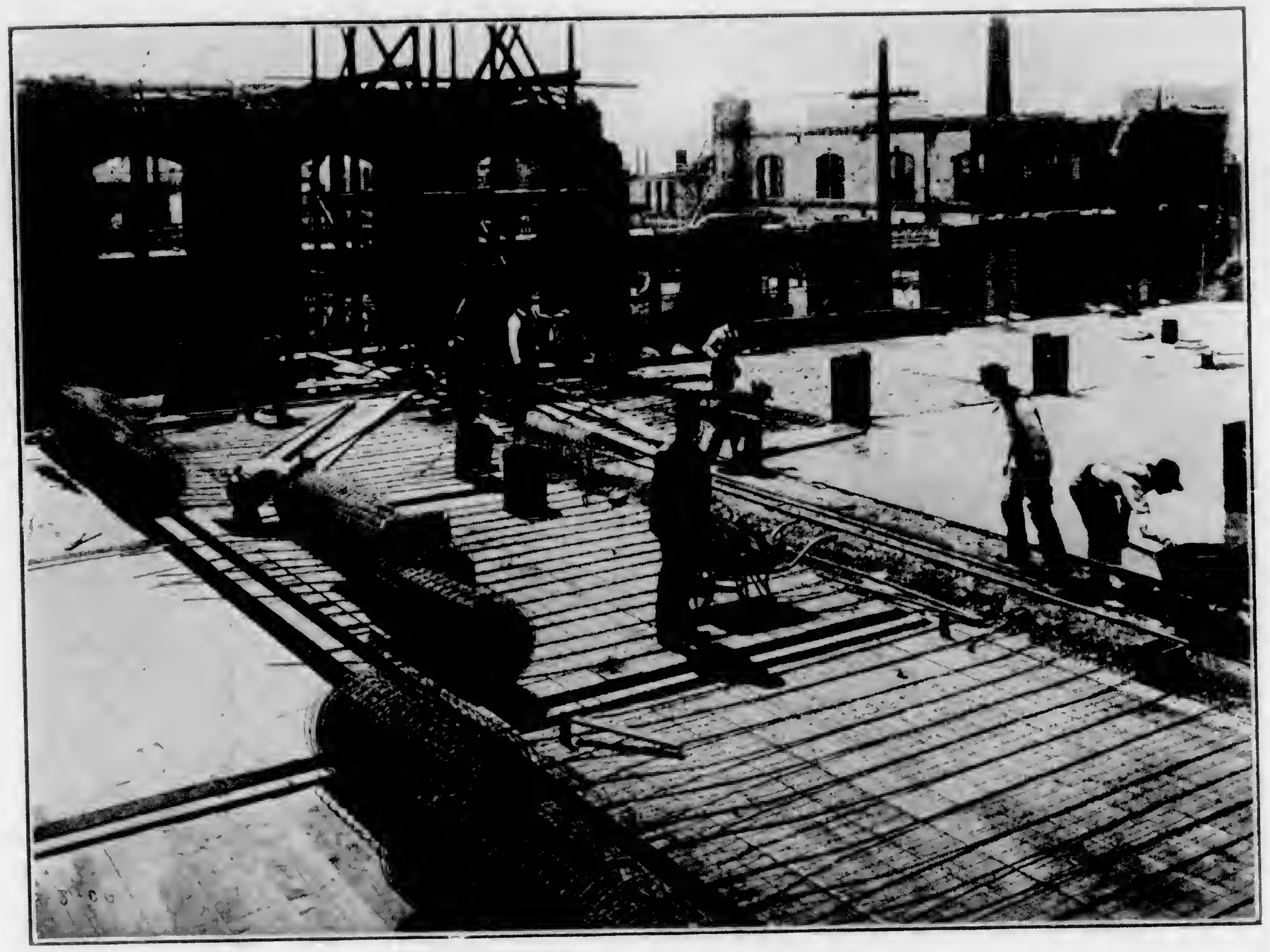

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Contents for September

PAGE.
Frontispiece **The Hotel Wentworth** - - - - - - - - - - 18
Reinforced Concrete Casing for the Protection of Piles in Wharf Construction - - *F. A. Koetitz, Member of the Technical Society of the Pacific Coast* 19
Illustrated With Diagrams by the Author
The Inventor of Reinforced Concrete - - - - - - - - - - 24
The Old California Missions and Their Influence on Modern Design - - - - - - - - - - - *W. L. B. Jenney, Architect* 25
Illustrated with Photographs of California Missions, Hotels and Residences
A Subway Without Excavation - - - - - - *Walter G. Hopkins* 35
Illustrated with Drawings by Mr. Reed and Chas N. Burrell
For the New San Francisco. A Series of Architectural Efforts - - - 39
Change San Francisco Fire Districts - - - - *P. H. Bosworth* 43
The Man Behind the Pick. A Verse - - - - - - - - - 44
Notes on the Construction of Steel Frames for Buildings *Jno. D. Galloway, C.E.* 45
Some Stanford University Residences - - - - - - - - - -
Charles Edward Hodges, Late Resident Architect at Stanford University 49
Brick and Terra Cotta
Structural Terra Cotta as an Exterior Fire Wall - *Geo. E. Walsh* 53
Cement and Concrete
Cement Block Architecture - - - - *Louis H. Gibson, Architect* 57
Concrete from a Brick Man's Standpoint - - - *W. F. Barnes* 61
Heating, Lighting and Electrical Work
An Improved Application of Hot Air Heating - - *A. O. Jones* 63
Fads and Fallacies in Hot Air Heating - - - *R. S. Thompson* 65
San Francisco Builders' Association - - - - - - - - 68
Interior Decoration
Novel Idea in Interior Decoration - - - - - *Sidney Phillips* 70
Wallpaper for Gloomy Rooms - - - - - - - - 71
The Portland Architectural Club - - - - - - - - 71
Among the Architects 72
Editorial 74
Publisher's Corner 77

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PAGE
Frontispiece The Hotel Wentworth - - - - - - - - - - 18
Reinforced Concrete Casing for the Protection of Piles in Wharf Construction - - *F. A. Koetitz, Member of the Technical Society of the Pacific Coast* 19
Illustrated With Diagrams by the Author
The Inventor of Reinforced Concrete - - - - - - - - - - 24
The Old California Missions and Their Influence on Modern Design - - - - - - - - - *W. L. B. Jenney, Architect* 25
Illustrated with Photographs of California Missions, Hotels and Residences
A Subway Without Excavation - - - - - - *Walter G. Hopkins* 35
Illustrated with Drawings by Mr. Reed and Clay N. Burrell
For the New San Francisco. A Series of Architectural Efforts - - - - 39
Change San Francisco Fire Districts - - - - - *P. H. Bosworth* 43
The Man Behind the Pick. A Verse - - - - - - - - - - - 44
Notes on the Construction of Steel Frames for Buildings *Jno. D. Galloway, C.E.* 45
Some Stanford University Residences - - - - - - - - *Charles Edward Hodges, Late Resident Architect at Stanford University* 49
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Concrete from a Brick Man's Standpoint - - - - *W. F. Barnes* 61
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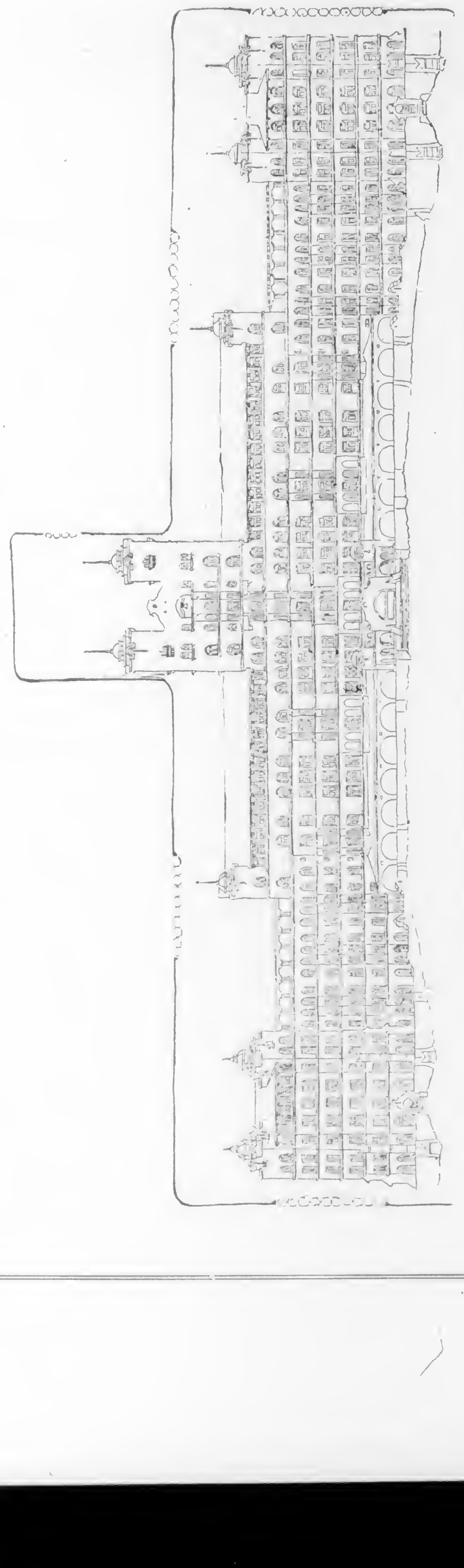
An Improved Application of Hot Air Heating - - - *A. O. Jones* 63
Fads and Fallacies in Hot Air Heating - - - - *R. S. Thompson* 65
San Francisco Builders' Association - - - - - - - - - 68
Interior Decoration
Novel Idea in Interior Decoration - - - - - *Sidney Phillips* 70
Wallpaper for Gloomy Rooms - - - - - - - - - - 71
The Portland Architectural Club - - - - - - - - - - 71
Among the Architects 72
Editorial 74
Publisher's Corner 77



Front Elevation of New Tourist Hotel, Pasadena. Charles F. Whittlesey, Architect

The Hotel Wentworth is now in course of construction at Oak Knoll, near Pasadena, and is to be completed in December. The main building will be six stories in height and the fifty-foot square tower will contain nine stories. An idea of the immensity of the structure may be gained from the fact that the distance around the building is about three-quarters of a mile. The building will cost $500,000.

1-19

THE
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Vol. VI. SEPTEMBER, 1906. No. 2.

Reinforced Concrete Casing for the Protection of Piles in Wharf Construction

By F. A. KOETITZ

Member of the Technical Society of the Pacific Coast and Vice-President and Engineer of the Pacific Construction Company

DURING the many years of my experience in construction work I have often wondered why some good practical means for the effective protection of wooden piling against the ravages of marine life and even against general deterioration had not been found, and from time to time I have investigated many so-called "pile protections," always to find them wanting in one or another necessary essential. After giving this matter considerable study I have finally designed a system that I am certain will prove effective as a protection, which, being relatively cheap, can be used in many instances without any wooden piling, and it is the object of this paper to bring this system before the members of this Association.

The main feature of this construction is a reinforced concrete casing of practical length, or sections of such casing joined together, and with them either to encase wooden piles or to replace them entirely. When properly placed, in any of the ways in which these casings would be applicable, they are then to be filled with concrete and are ready to receive the superstructure.

The casings may be made of almost any desired diameter and with any preferred reinforcement, and for those of 18 in. to 24 in. diameter the shell need not be over 1¼ in. thick, larger diameters to be proportionately thicker, and the casings are, therefore, easily handled.

Fig. 1 shows two such sections of the casings joined by a simple sleeve that is inserted and properly connected at the place of manufacture. This connection is designed for light work only, such as protecting piles or certain portions thereof, or for repairing old piles. The bottom forms a shoe and at the same time serves as a guide in sinking the casing over the pile.

Fig. 2 shows a casing for heavier work, to be used more in the nature of a cylinder, with various sections joined together by proper cap, splices and shoe of metal, and the desired number of longitudinal rods. The shoe, if preferred, may be made of concrete similar to that in Fig. 1. In this case, the sections are assembled at the site of the work, as needed; they are supported, while being sunk in place, by rods, and when placed these rods are embedded in the concrete filling and form an additional reinforcing of the concrete and an absolute bond of the joints.

Fig. 3 shows these casings in the construction of trestle bents or

Fig. 2.

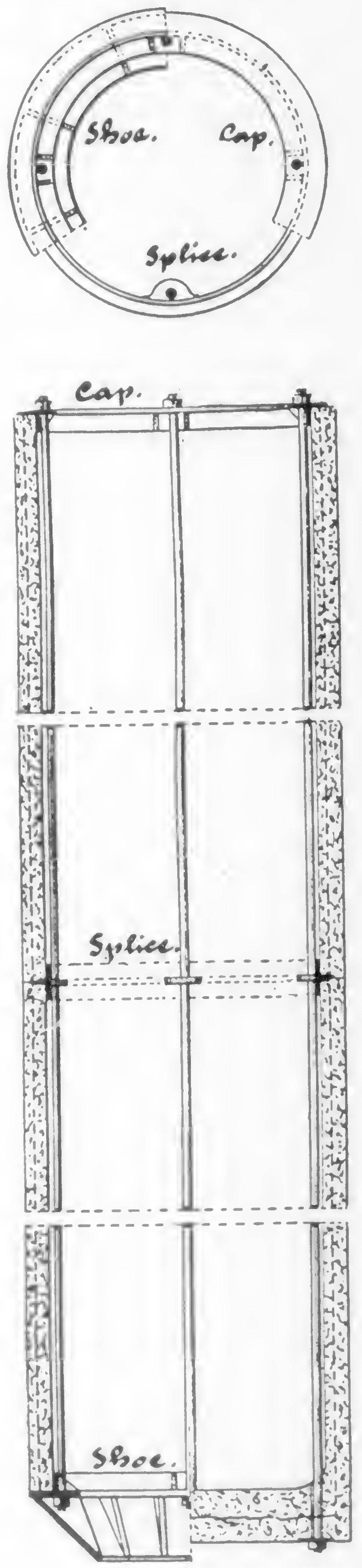
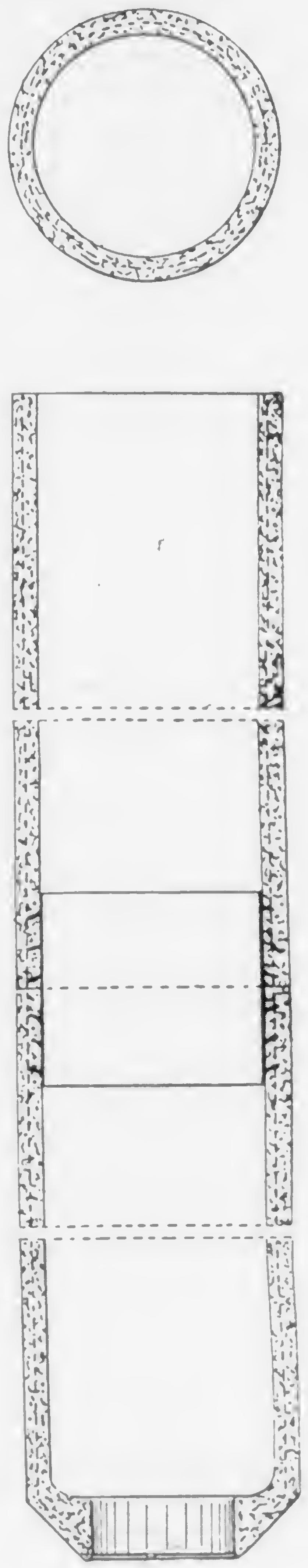


Fig. 1.



piers, with cap of wood or steel, anchored to the interior concrete, also with wood or steel bracing, attached in an approved substantial manner.

Fig. 4 shows the use of casings in conjunction with a reinforced concrete top work for piers or trestle where the head room is small and only a shallow bracing can be used. This combines the bracing and main girder ali in one and will be found very rigid and durable.

Fig. 5 shows the use of the casings in the construction of wharves where they are admirably adapted to carry a reinforced concrete floor construction. Such a wharf would be almost indestructible, requiring practically no repairs, and would be entirely fireproof. It should be obvious to any builder, that such a wharf must be a better investment than a wooden one under almost any condition. Where this wharf is used for docking vessels, it should be surrounded, of course, with the usual spring lines of wooden piling.

While the upper parts of these casings are suitable for any style of superstructure, the lower parts can be constructed and adapted to fit almost any kind of foundation.

Fig. 6 shows, perhaps, the most common requirements. This consists of driving a pile to its proper bearing capacity, of cutting off the pile, thus driven, at the desired level (or of cutting off an old pile at such level), of sinking the casing over the pile to the required depth for the protection of the pile, of pumping out the casing and of filling the interior with concrete. The lower shoe, as shown, forms a guide to keep the casing always at a certain distance from the pile, so as to assure at least a certain fixed thickness of concrete between the pile and the casing. The conical shape of the shoe tends to throw the soil or mud away from the pile and will allow only a minimum amount to enter the casing. It also serves to compress the soil at the bottom, which gives additional bearing capacity to the pile. It also forms a practical seal against the ingress of water between the pile and shoe, which will allow the water to be pumped out, and also any mud which may have entered, before placing the concrete filling.

Fig. 7 shows a case where, for some reason, it is desired to sink the casing with hydraulic jet first and then drive a wooden pile with a follower to a firm bearing through and below the bottom of the casing. The jet shoe of the casing is attached so as to disconnect easily from the casing, and is shaped so as to act as a shoe for the wooden pile.

Fig. 8 presents a case where rock or other firm stratum is reached. The bottom of the casing in this case is closed except for a connection in the center for a water jet pipe, by which means it may be placed in the usual manner. When proper bottom is reached, cement grout may be forced through this water pipe, which will serve to cement the casing to the bottom and give it a firm bearing.

Fig. 9 shows how an additional connection to the bottom may be made if desired. Drive with a follower a short steel pile, or pin, through the bottom of the casing after it has been sunk to place and bottom grouted. In this case the metal plate which closes the bottom of the casing, during the process of sinking, is so constructed that it will easily disconnect from the casing when the pile is entered, and the plate is of such thickness that it will readily shape itself to conform to the point of the pile when the pile is forced down to place.

There is provision for making different lengths of piles by adjustment of the top sections. After the foundation is secured and casing built up, if the top section is found too long, this section may be removed and one of exact required length substituted. In case a section is found to be

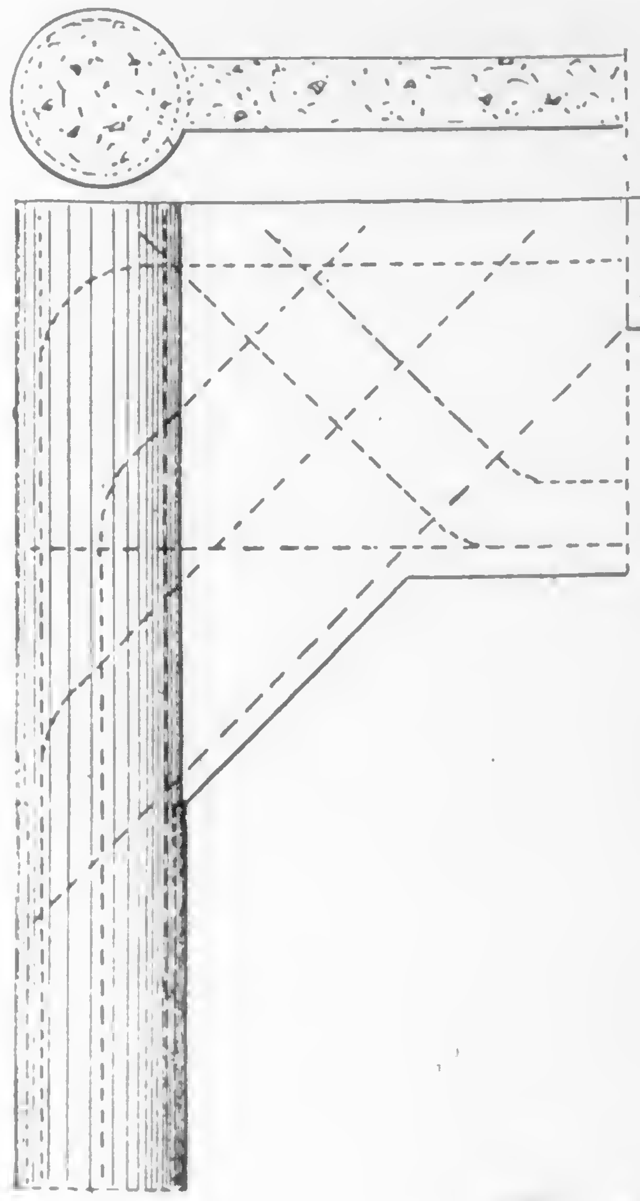


Fig. 4.

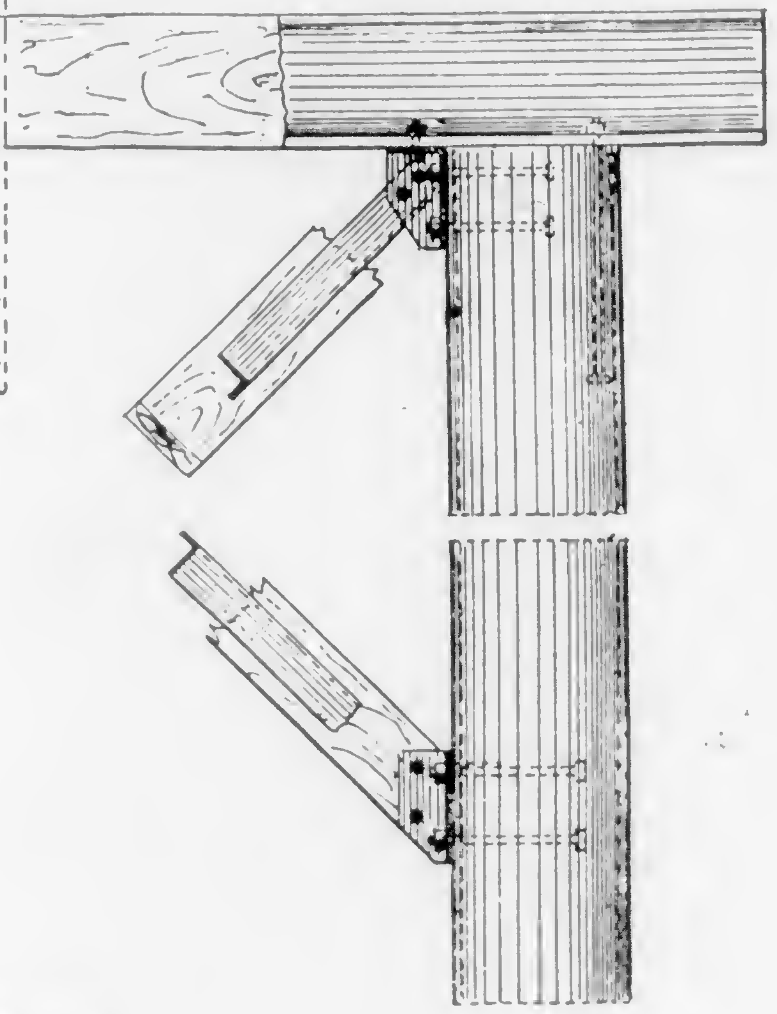


Fig. 3.

Fig. 5.

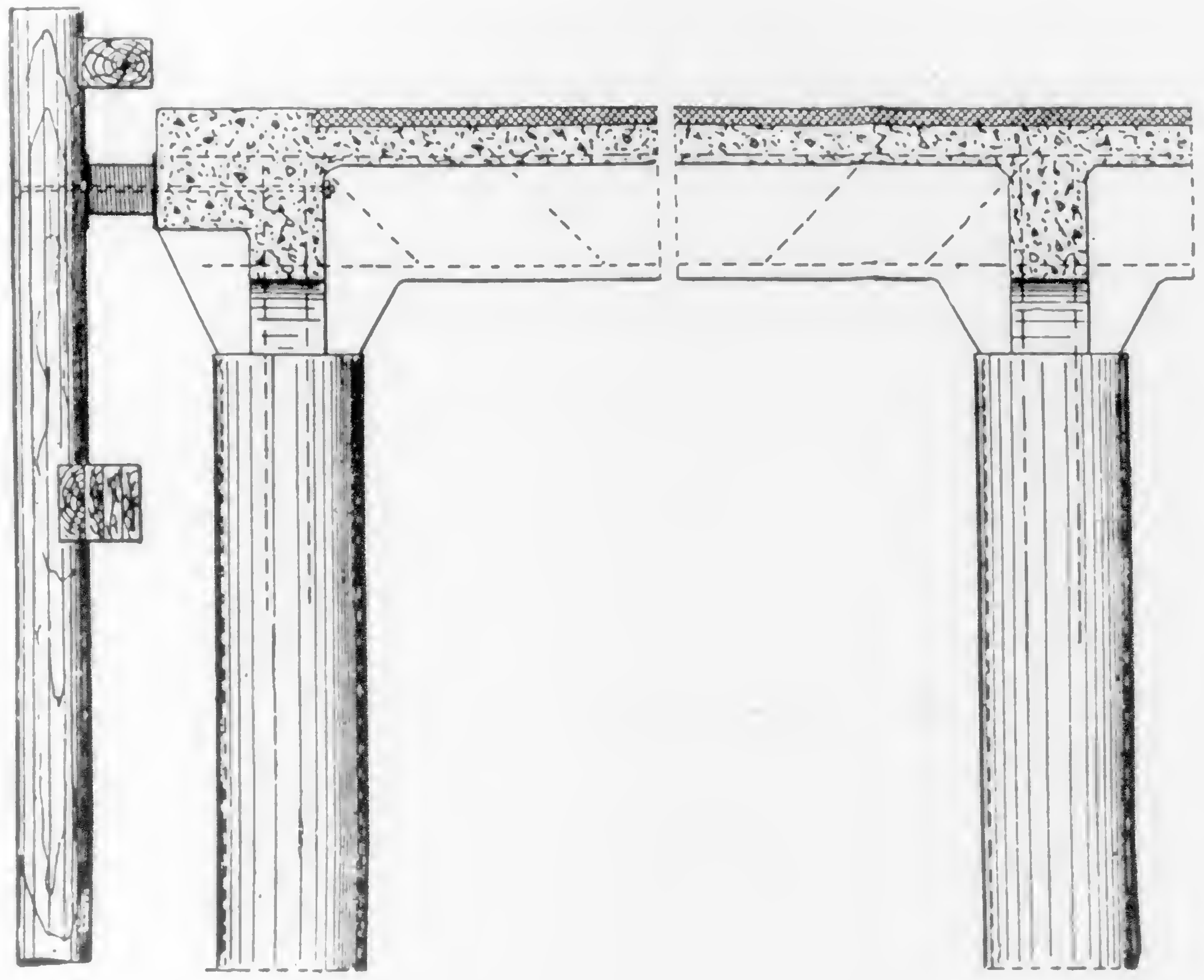


Fig. 6.

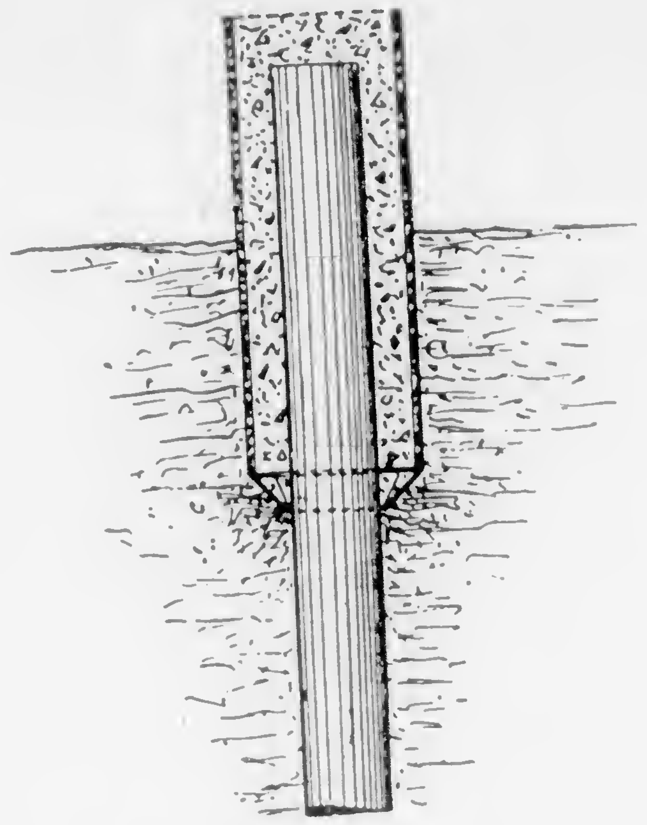


Fig. 7.

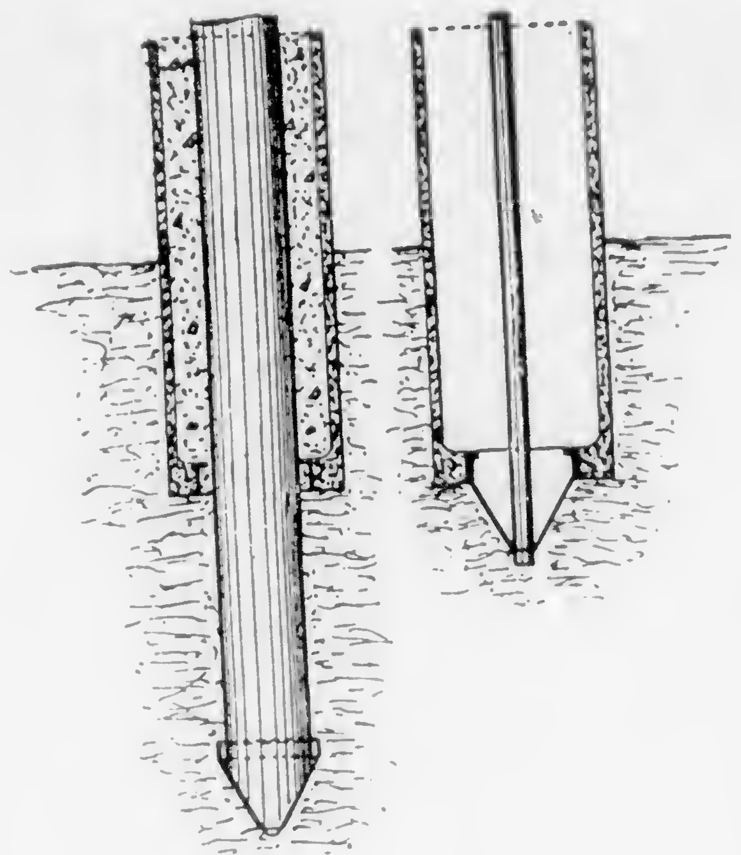


Fig. 8.

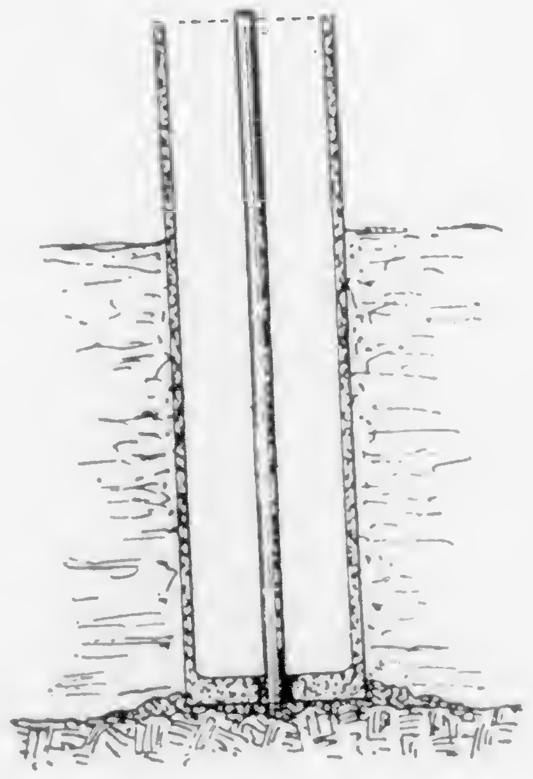


Fig. 9.

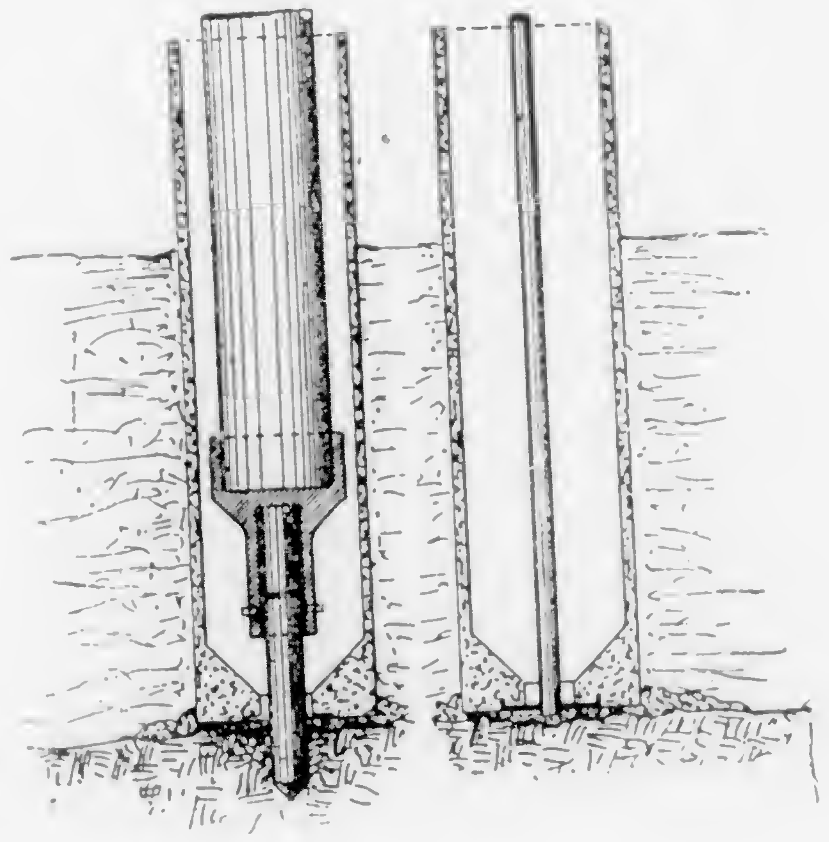
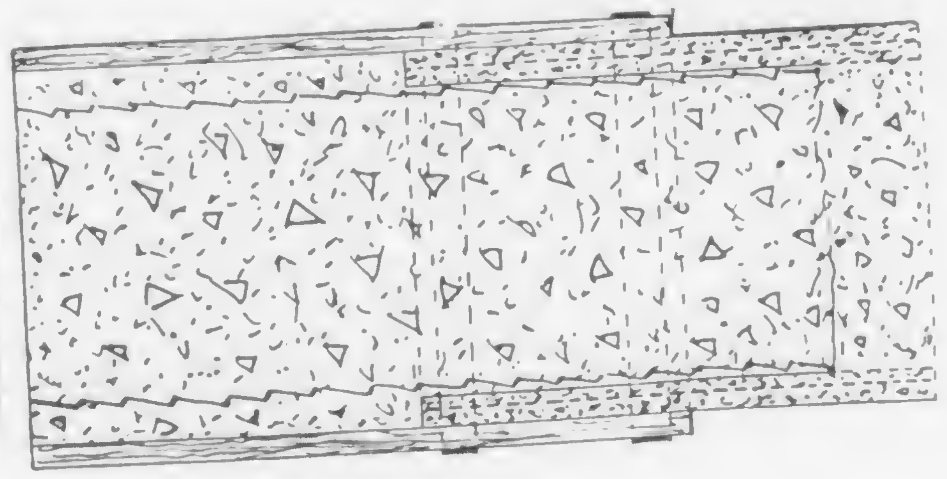


Fig. 10.



too short, or it is not convenient to remove it, when short, the pile may be lengthened, as shown by Fig. 10, by placing a circular detachable form around the outside of the casing, placing the proper amount of reinforçing inside and filling the whole space with concrete, as desired. This same method may be used in constructing the upper concrete work shown in Fig. 4.

It would seem apparent, without going further, that it is easy to apply one or another of these examples to any requirement.

In closing, I may be pardoned for mentioning some of the advantages of this system over other similar forms of construction. Concrete, no doubt, being the principal requirement for good results, it becomes simply a question of using it in the best and most economical manner. If used in steel or wooden cylinders, the outer casing, it must be admitted, should be considered as only temporary, and the size of the concrete column is so made that, when the outer shell has served its purpose as a form, after due time, this concrete must stand by itself.

It being more or less difficult to determine just how successfully concrete in cylinders has been made, and also for various other reasons, the cross section of the concrete column is usually made large which gives a correspondingly large exposed surface to the action of water or waves in the pier. With this concrete casing the best and most durable part of the column is on the outside, and the cross section may then be materially reduced and, with it, of course, the exposed surface. This naturally leads to the question of cost or rather to relative cost of this construction. It may be easily demonstrated that since the volume of the concrete, which is the most expensive item, is greatly reduced, the price, complete in place, for the same length and bearing capacity of the structure is at least no more, and probably in most cases rather less, than that of any of the other methods used, even allowing for the more expensive outer casing, and I am very certain that its superiority is apparent.

* * *

The Inventor of Reinforced Concrete

IN 1854 Mr. W. B. Wilkinson, "a plasterer and manufacturer of artificial stones," of Newcastle-on-Tyne, took out a patent for fire-resisting construction in which the fundamental principles of modern reinforced concrete construction are embodied. Not only does this patent cover the reinforcement of floor slabs with crossing iron bars, but it shows how to reinforce concrete girders or beams to sustain these floor slabs. It is plain from the patent specification that Mr. Wilkinson clearly understood the subject, and had practically investigated the principles involved. His was no blind leap in the dark, and it seems that he must be acclaimed as the real inventor of modern reinforced concrete, where the metal is only introduced to strengthen the concrete in tension, designed on a scientific basis. This patent also is the first to suggest the construction of tubular partitions with keyed joints. He founded the firm of W. B. Wilkinson & Co., Ltd., of Newcastle-on-Tyne, which is well known for its work in plain and reinforced concrete today. It is stated by this firm that some years ago a fire unfortunately occurred at their offices and destroyed all the old books and papers, so that the particulars of early contracts (of which many important ones are known to have been carried out in the sixties and seventies), executed by the firm have been lost.

Mission of San Luis Rey

The Old California Missions and Their Influence on Modern Design*

By W. L. B. JENNEY, Architect

THE story of the old missions of California dates from the establishment of the first mission at San Diego in 1769. These old missions were military posts as well as religious centers. They were directed and assisted by the old Jesuit Missions of Mexico that presented church property as well as such agricultural tools, implements, seeds and animals as they were able.

At San Diego the military and navy assembled on the site selected for a presidio, where a temporary altar was erected and bells, hung between the trees, were rung. A crowd of natives collected to witness the ceremonies. These natives were of a very low order both physically and intellectually, nearly naked and crudely armed. They spoke a very rough, barbaric language that the fathers were forced to learn before they could impart any instruction to the ignorant savage.

The order from the king to establish the San Diego Mission included a mission at Monterey. The military detail intended for Monterey halted at San Diego only for a short rest and then pushed on. They failed to find the locality and soon returned to Mexico. A year later a new expedition was more successful and established the Mission of San Carlos at Monterey. They were soon joined by a vessel, the San Antonio, which had been sent from Mexico. A chapel, work shop and dwellings were clustered along the beach, at first of a temporary character. The locality was favorable, the live stock multiplied rapidly, game was abundant. By gifts of gay calicoes and trinkets the natives were attracted and soon became attached to the fathers, who taught them not only religion but trades and agriculture, as they did at all the missions, so that large numbers soon became very useful to themselves and to the mission.

A year later the San Antonio again arrived from Mexico bringing supplies and a relay of ten priests. Now the fathers were able to establish new missions. The San Antonio July 14, and San Gabriel September 8, 1771; San Luis Obispo, September 1, 1772.

The missions suffered severely from occasional raids and other criminal violence of the natives, causing the death of several fathers and the loss of property, particularly horses, by theft. When the thieves

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Church, Los Angeles
Maginnis, Walsh & Sullivan, Architects

Sketch for Residence of Mrs. Hollenbeck, Los Angeles
Morgan & Walls, Architects

Carmelo Mission

were followed closely they abandoned the horses, which ran wild, and these multiplied rapidly, resulting in herds of considerable size roaming over the country.

The Bay of San Francisco to the north had been discovered and the Mission of San Francisco founded, and shortly after the Mission of San Juan Capistrano.

San Juan was evidently the finest mission up to this time, although built almost entirely by Indian labor. It was seriously injured by the earthquake of 1812. Early in the year 1779 the Mission of Santa Clara was established upon the fertile plain of San Bernardino. The fathers had considerable trouble with the Indians stealing cattle and horses, until some of the thieves were caught and executed, and from that time they stole no more cattle. In 1812 and 1818 earthquakes almost destroyed the buildings of the missions generally, but worse than all other elements of destruction is what is called secularization, which seems to have been a general taking possession of the missions by the government, from some very short-sighted, mistaken policy, said to be political. The cattle and lands and even the buildings were sold and the poor Indians were deprived of what they had acquired by industry and long possession. The same dismal tale is told everywhere.

Of these old missions, and there are about twenty scattered along the coast from San Francisco to San Diego, the most artistic architecturally is that of San Luis Rey, founded in 1798. It is still in large part in good preservation. This mission is in progress of restoration in what the English call a "pious restoration"; that is, as near as possible to its original condition in every detail. One of the well preserved, or, rather, restored missions is Santa Barbara, located on a small bay near a large village, which was governed by a chief very friendly to the missionaries. The Indians assisted to erect the building. The church suffered much in the great earthquake, so that it was rebuilt, 1815-1820, with strong walls of huge stone with good buttresses, and a six-bell, two-story tower. There is a fine garden in the cloister or patio and a fine large fountain in front of the church.

The entire mission is well cared for and much visited by tourists. The proudest edifice of this time was San Juan Capistrano, founded in 1776, and reduced to a ruinous condition by the earthquake of 1812. Miss Powers in her admirable little book on the Missions of California, styles it the Melrose Abbey of the West, as she fancied the impression therein by moonlight closely resembled each other. Unless there is something lacking in your soul, a trifle nonsensical I think.

As the old missions of Mexico gave birth to the then new missions of California, naturally we must look to Mexico for the origin of the type, evidently derived from the Spanish Colonial Renaissance, but we must bear in mind the great difference in the environment, the lack of skilled labor in California, and that the architects were in most part the Franciscan Fathers, who were not professionals. The material at hand in California was often the "adobe," which, owing to the necessity of quick work, frequently served a good purpose for the temporary building.

Later the churches were often built in a much more substantial manner of cut stone and mortar with good buttresses.

From necessity the missions architecturally are very simple, while those of the Spanish Colonial in Mexico were exceedingly rich in decoration, often too much so. (See the Chihuahua, the best specimen, I think, in Mexico.) In the mission church the small amount of decoration used

Mission of Santa Barbara

was usually confined to the sky line of the gable end, to the principal entrance and the architectural features of the tower, which usually had two rather low upper stories provided for bells, roofed by a dome, surmounted by a small temple-like finial. The architectural details were usually of Doric Renaissance. The sky lines of the gable recall somewhat the Elizabethan. There is often a cloister of considerable dimension, sometimes, as at Santa Barbara, planted as a garden. The walls are often strengthened by buttresses.

The characteristic features of the mission buildings and the mission style when adapted to modern work, of which I have given numerous examples, the traditions of the missions preserved in our modern designs, are in large part principles rather than the reproduction of architectural features. It is true that one often sees that striking gable end cut in a stereotyped meaningless sky line, the use of which is, as I heard remarked, rather the abuse than the adaptation of the mission style. There are other architectural features that are more sensible that seem to mark the style—such as simplicity with good proportions, broad projections to the tile roof, corridors, verandas or arcades—a courtyard, often planted as a garden.

Sometimes one sees the mission-like tower and buttresses and a Doric doorway. Then again one sees a design that suggests to the mind the mission style without there being apparently any special reason.

A close study shows that the modern design bearing traditions of the mission style consists in its principles of good architecture generally, such as satisfying the requirements in the most direct manner, adaptability to the environment, the most economical use of the material, the use whenever practicable of the material at hand in the most skilful manner, the using of proper proportions in all parts with a judicious and agreeable fenestration, etc.

The station on the Santa Fe at Albuquerque is a very artistic and picturesque design that might have been designed by an old mission architect. The environment of the Indians and their adobe huts are near by.

I find this to be true that wherever I find a dwelling, or I may say a building, that suggests the mission style I always decide at once that it deserves study and usually end by admitting that it is a good design.

Mission of Santa Barbara

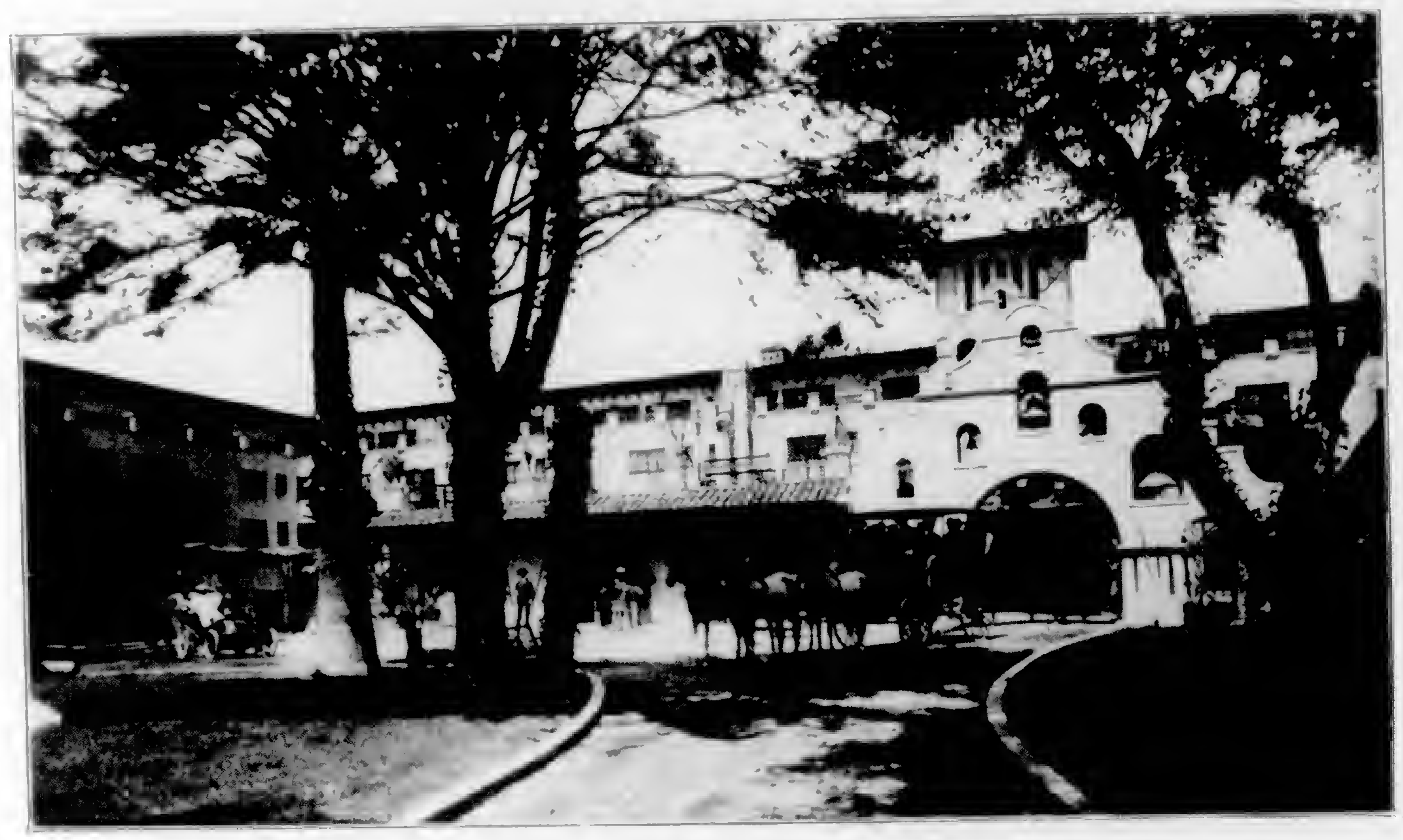
I found in the city library (Los Angeles) a very fine work entitled "Spanish Colonial in Mexico," by Sylvester Baxter, published in Boston by T. B. Willet. One folio volume of text and five volumes folio of photographs, nicely mounted. It is well worth the perusal of all interested in the subject.

Mrs. Hollenbeck's residence, near the old folk's home, she has built at Boyle Heights, Los Angeles, shows the mission influence.

In Los Angeles and the environment there are more cottages per square mile than I think can be found elsewhere. Those of one story are called bungalows; many have a story and a half, and the majority show a mission influence, but not the church gable seen in Mrs. Hollenbeck's residence and in the typical mission residence. This belongs to the church and not to the habitations, though to many it is the characteristic of the style. The architects of Los Angeles have by degrees worked up a so-called mission style of their own, omitting, however, almost entirely the church gable, confining themselves to features of the habitations. The roofs are usually quite steep, 40 to 45 degrees, with projecting eaves, often covering the porches or verandas. Frequently, however, the verandas are behind an arcade as in the typical mission residence.

In the cottages or bungalows the chimney is usually outside, often built of brick dotted with small boulders. The habitation is set well back from the street with a lawn in front, decorated with the date palm, the royal palm, and the California fan palm, the picturesque dracena, many fine flowering small trees, and beds of tea roses and borders of flowers. When the grounds admit of it there is the characteristic pergola covered with climbing roses or vines. When the site is high it is terraced and a retaining wall built on the sidewalk line, with the ground behind the wall filled in high and sloped to the face of the wall, which is usually built of boulders laid in cement mortar with the joints kept well back from the face, the rounded face of the boulders projecting. Along the inner face the wall is planted with all of the trailing vines, of which there are so many here, which are filled with pretty daisy-like flowers in many colors. I saw one terrace wall covered with the trailing rose geranium almost covering the face of the wall with its

Mission of San Antonio de Padua

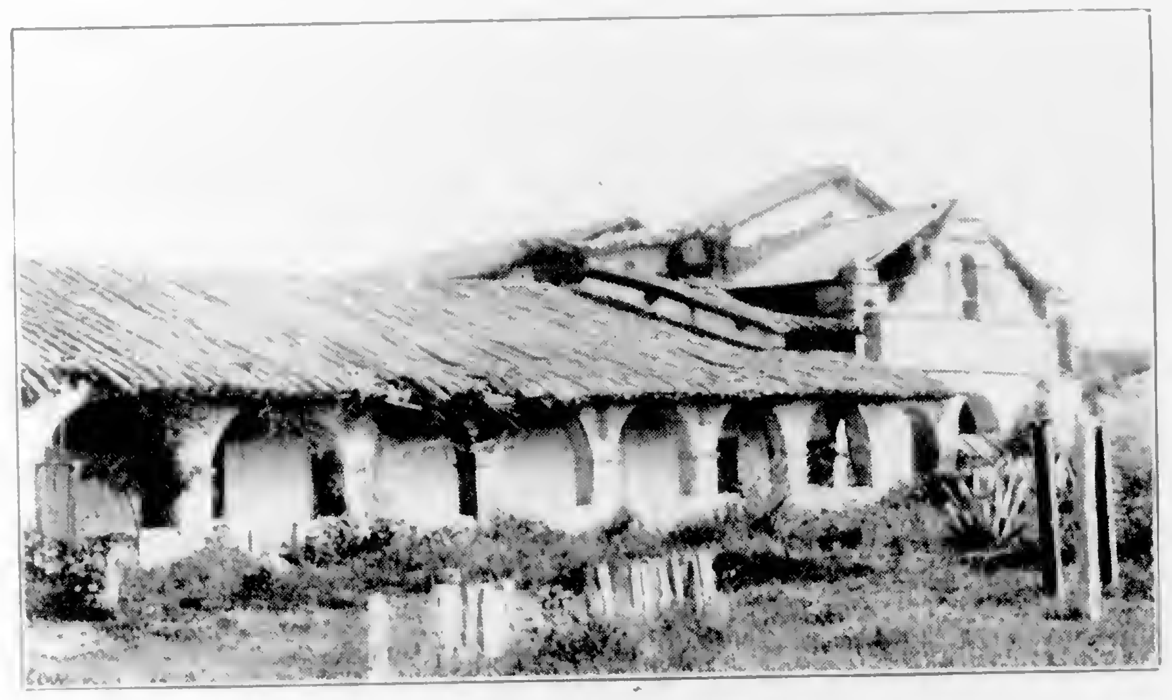


Mission Hotel, Riverside

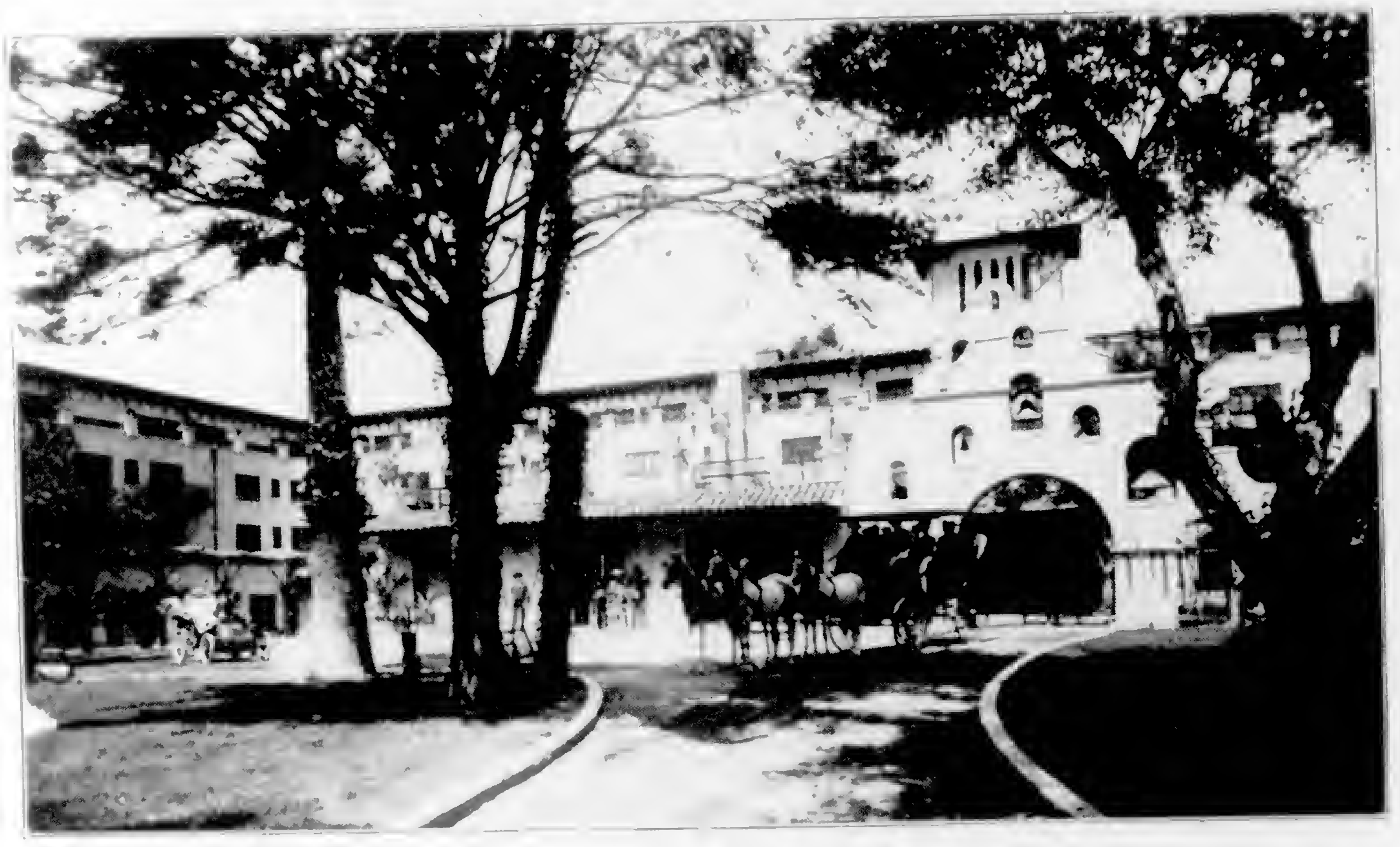
Mission of San Gabriel

A Bit of the Riverside Hotel

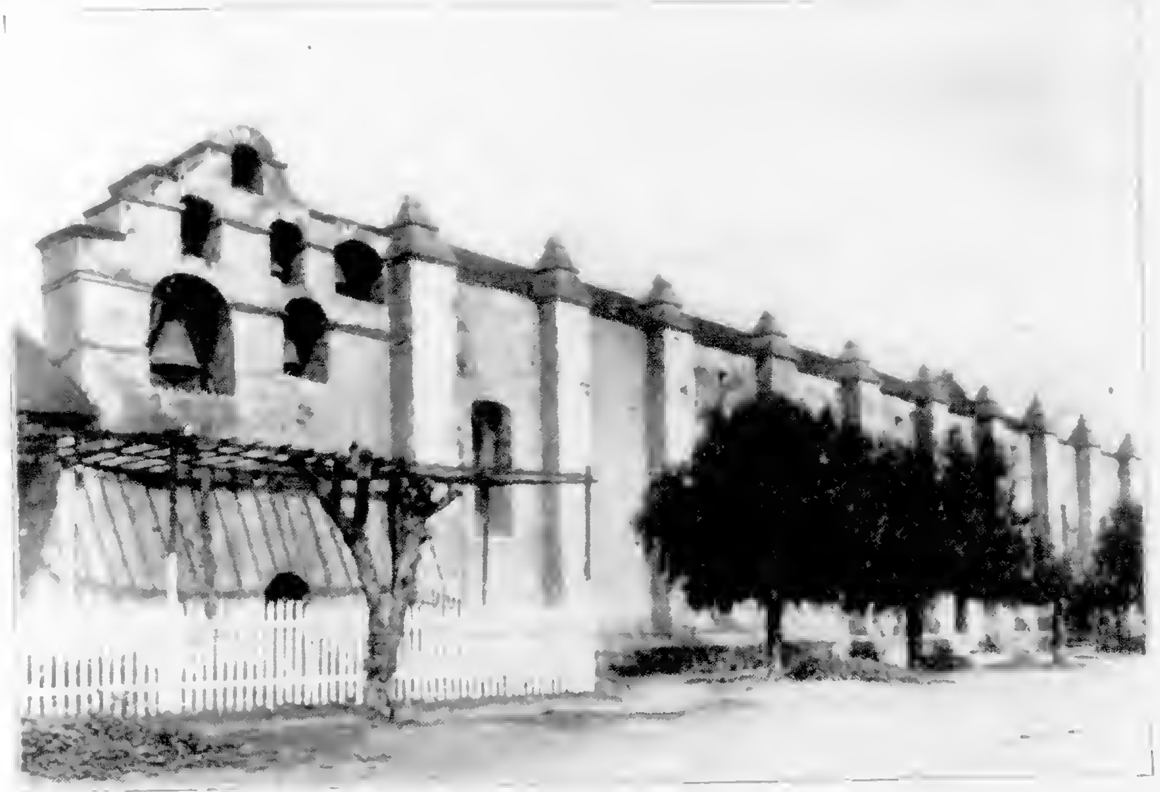
A Corner of the Riverside Hotel



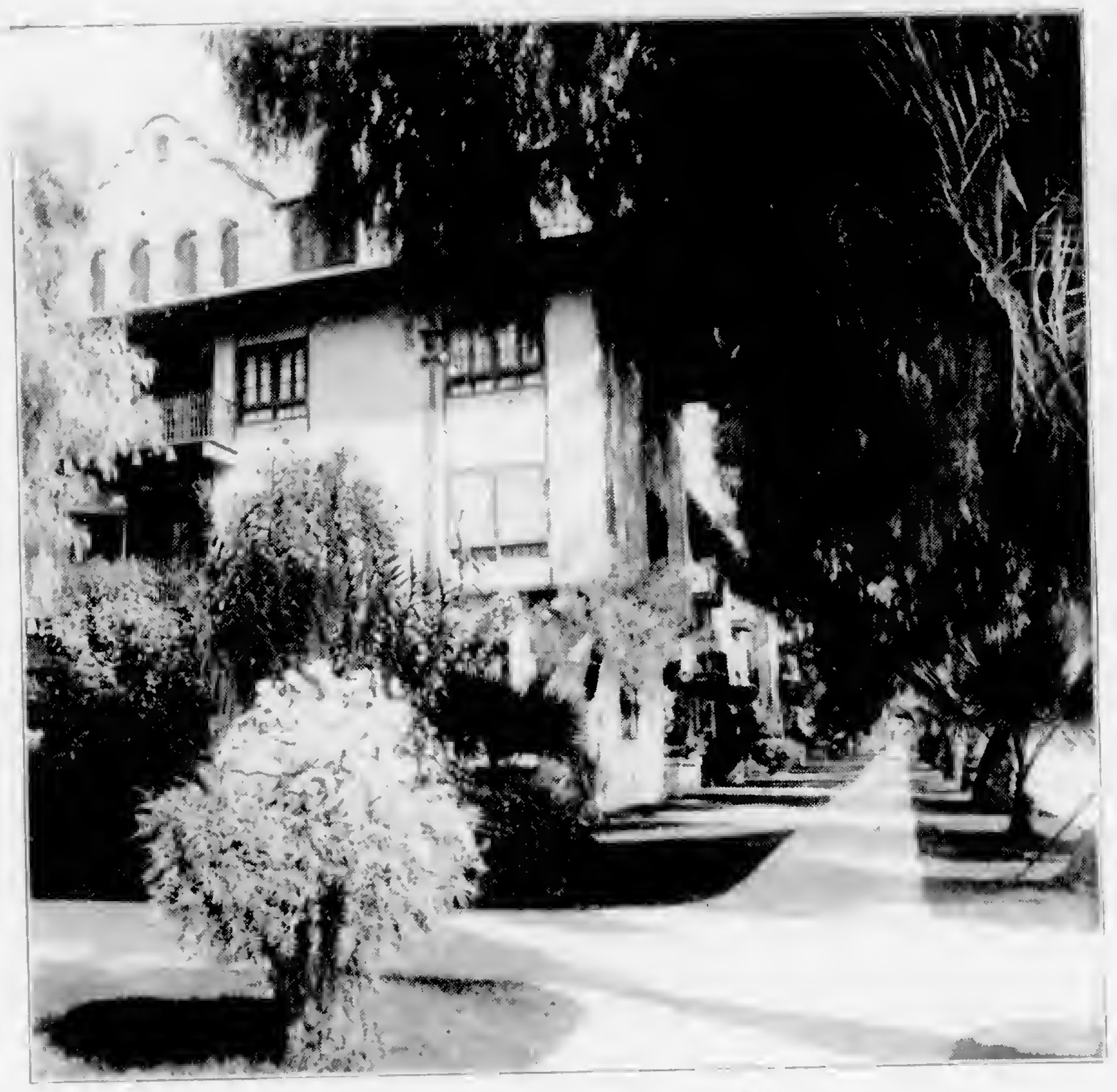
Mission of San Antonio de Padua



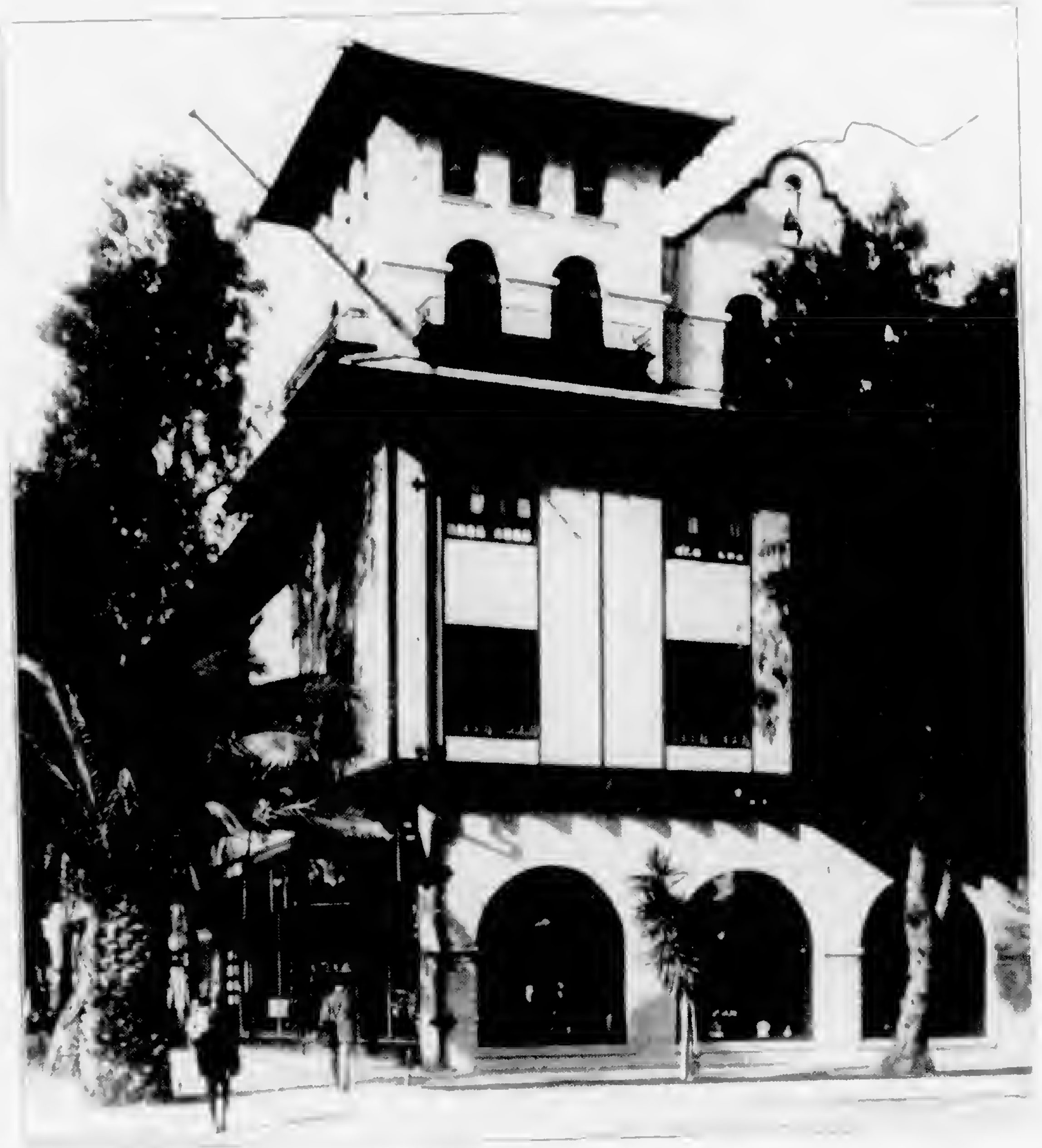
Mission Hotel, Riverside



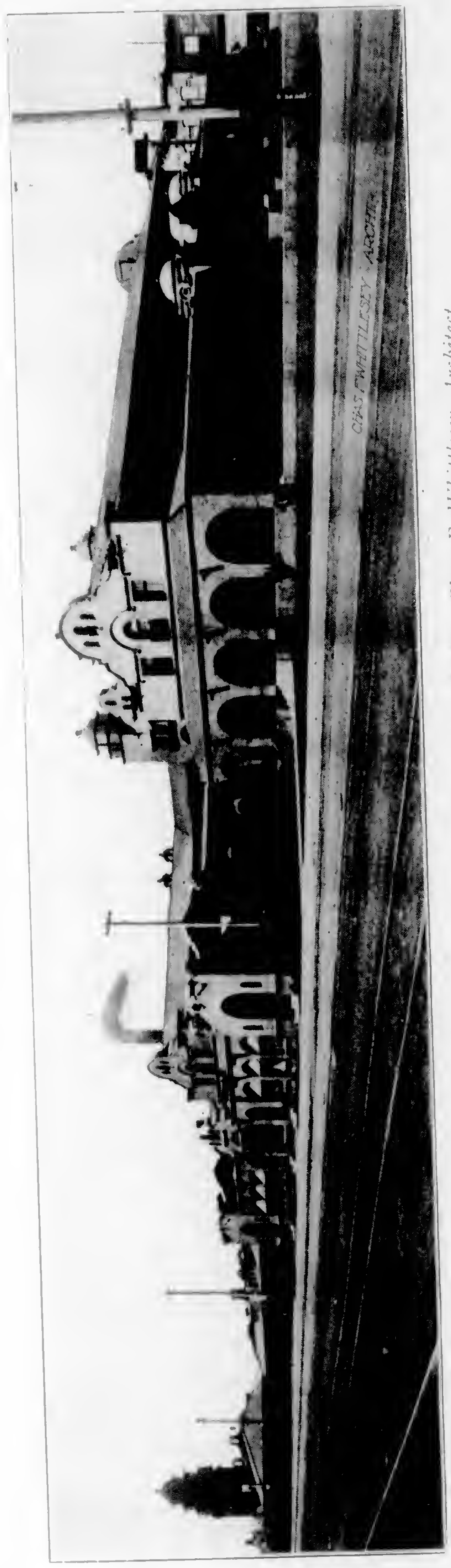
Mission of San Gabriel



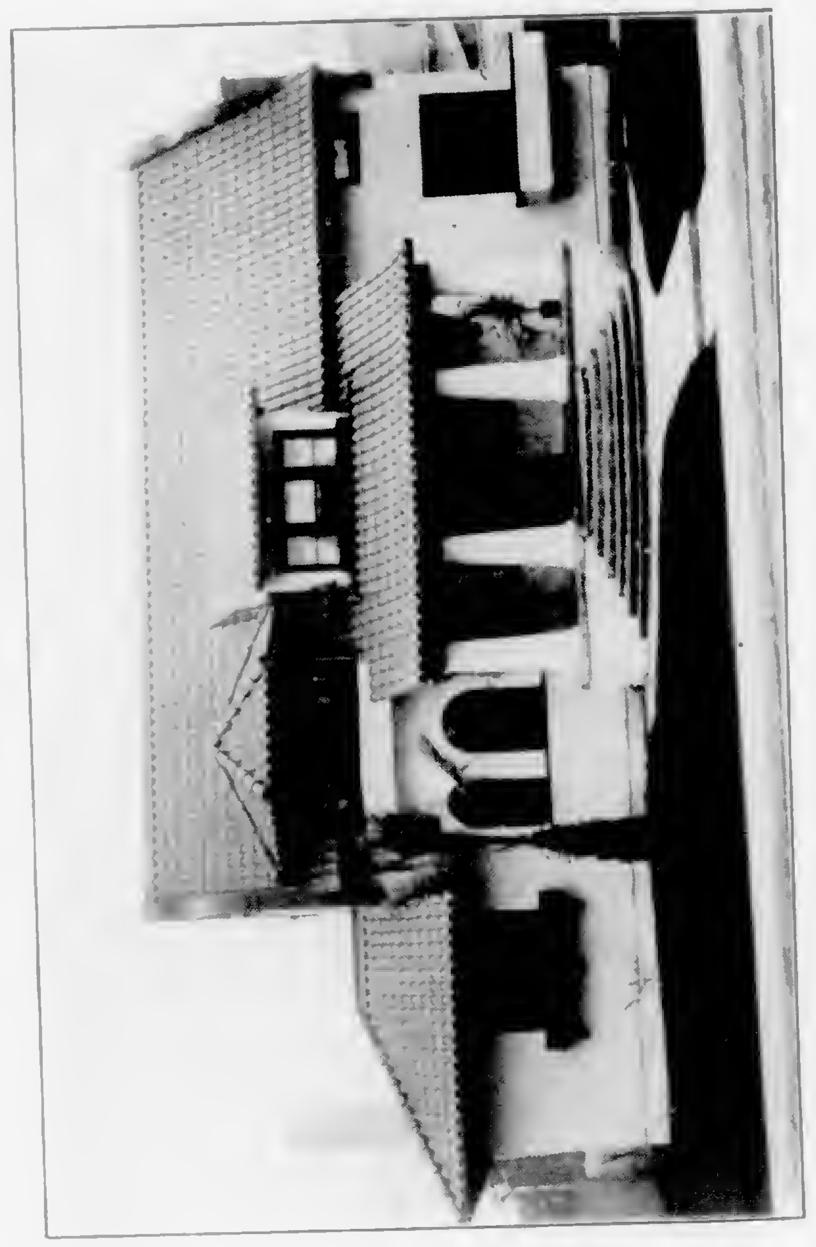
A Bit of the Riverside Hotel



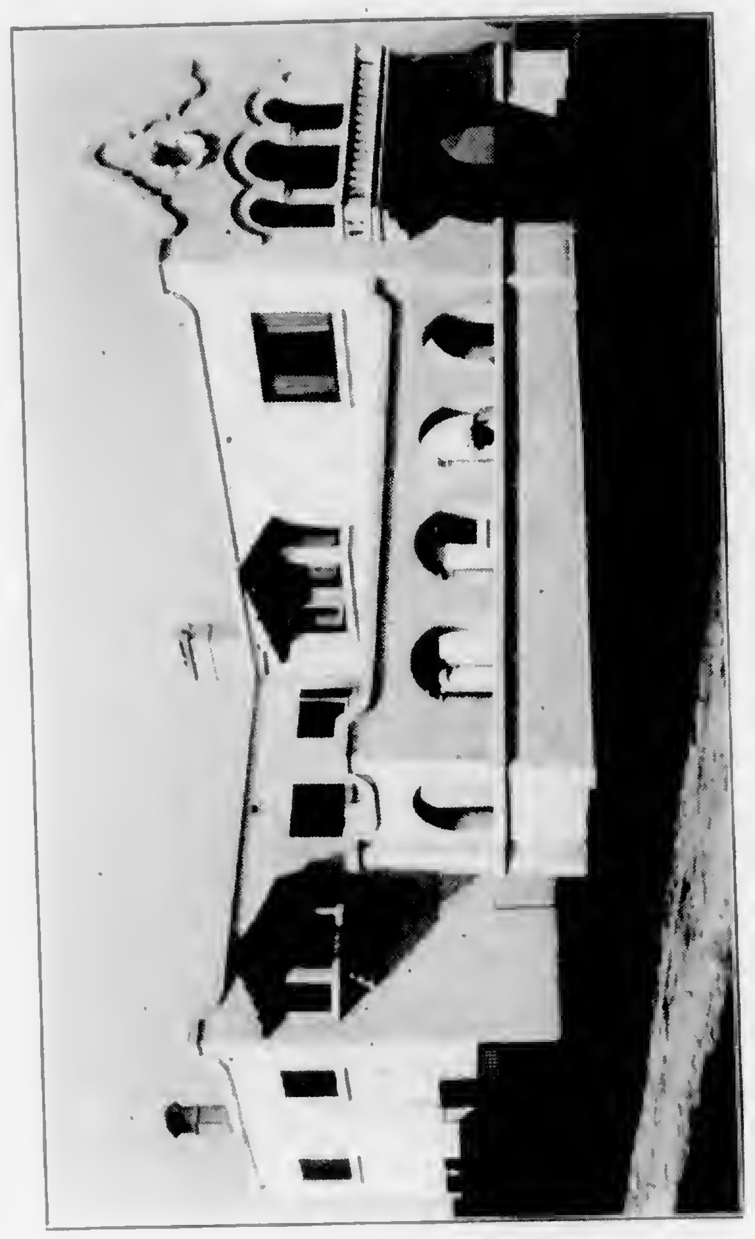
A Corner of the Riverside Hotel



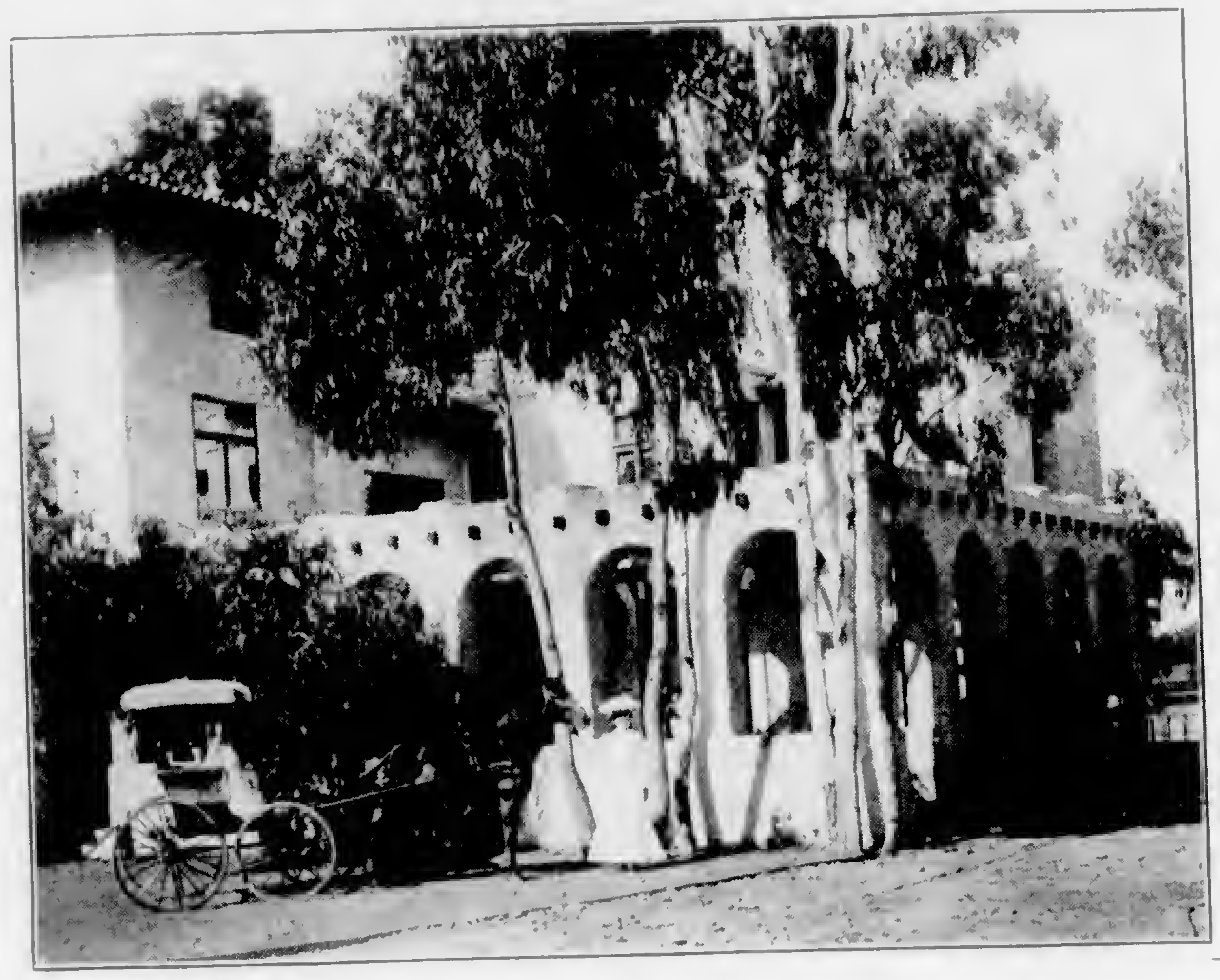
Station and Hotel for Santa Fe Railway, at Albuquerque, N. M. Chas. F. Whittlesey, Architect



Residence of Mr. Severance, Los Angeles. J. C. Newsom, Architect



A Los Angeles Residence. John Parkinson, Architect



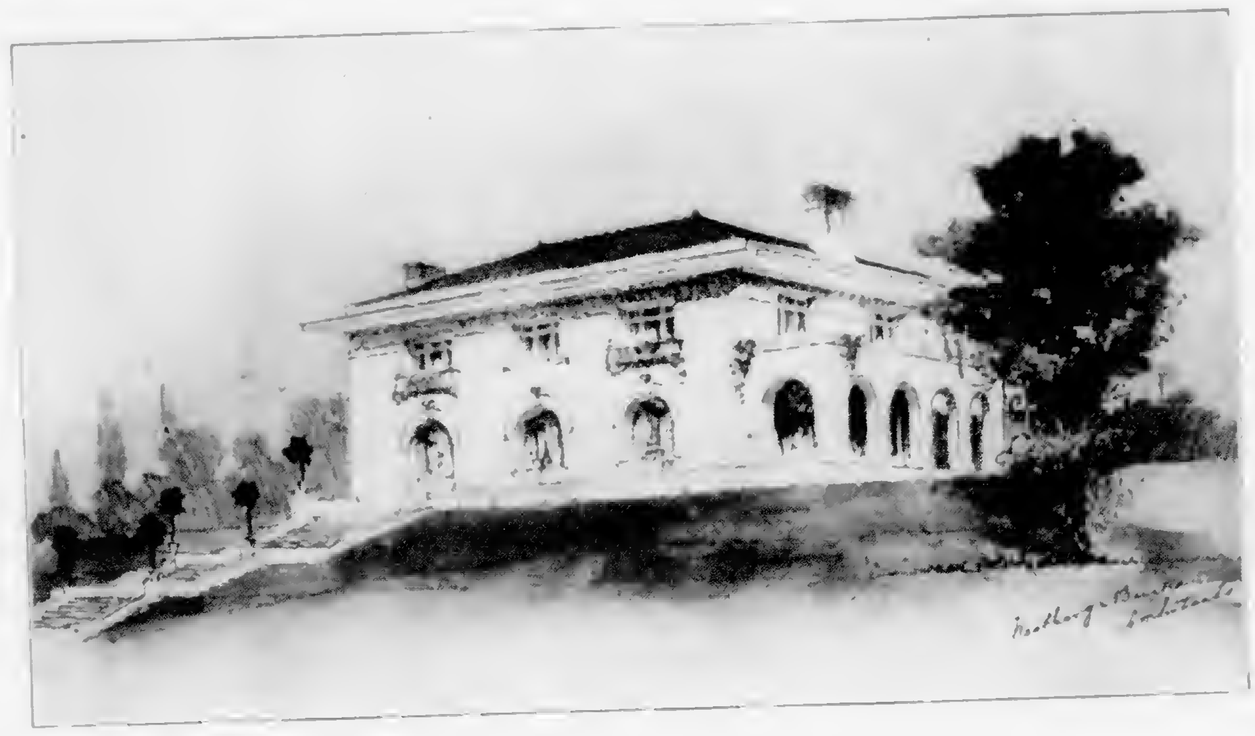
Residence of Mr. Bartlett, Los Angeles
C. F. Whittlesey, Architect

bright rose colored flowers and green leaves, making a very pleasing effect.

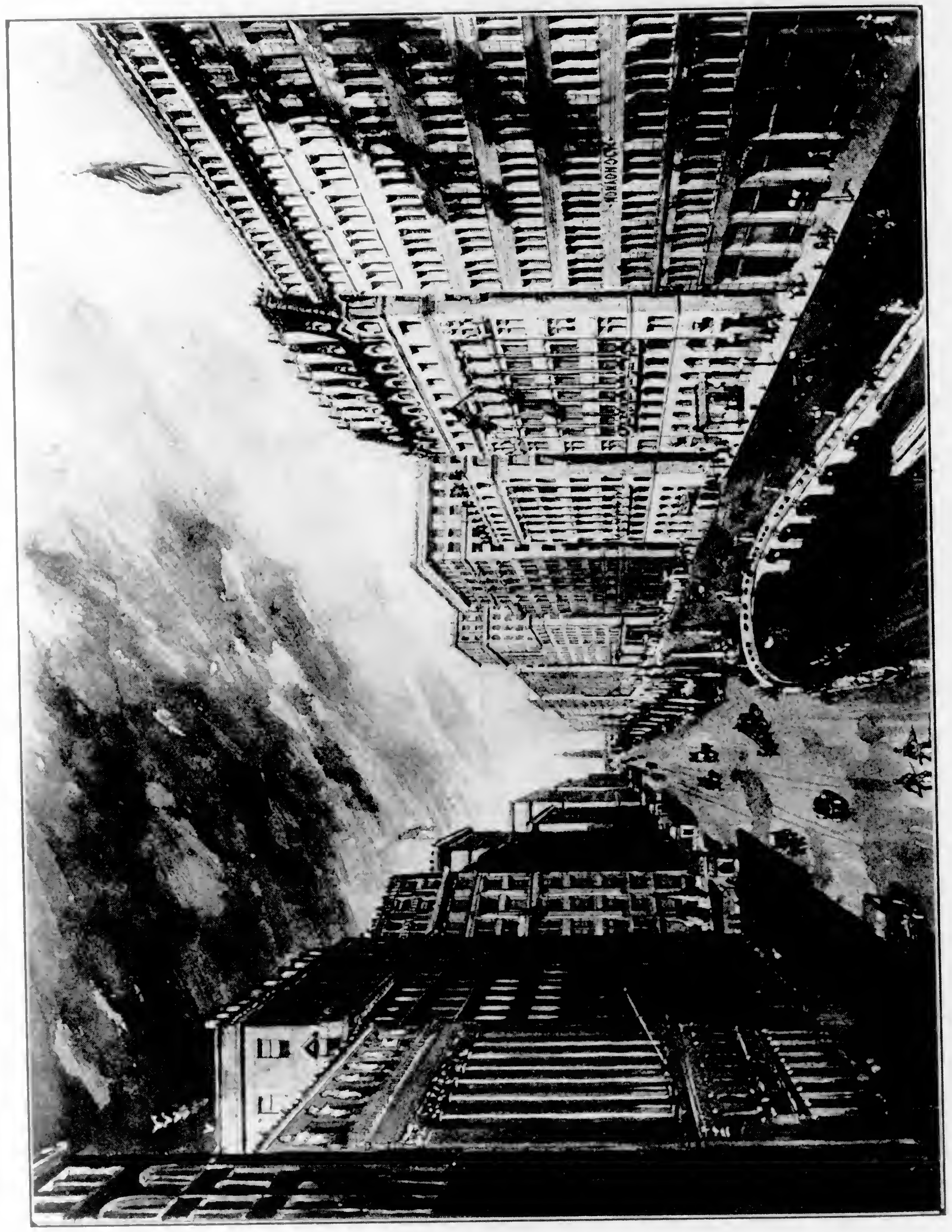
The lots are usually separated by hedges. There are many hedge plants that grow well here and are always green, and usually in flower, such as the laurestine, which is used so much in Italy; the calla lily, red geraniums, a continuous bloomer here, and many others.

Flowers here grow so easily and cost so little that every cottage, however humble, is surrounded by a garden. Most every one has also an orange tree or two and a lemon, ornamental as well as useful.

Riding near an old mission I saw an aged priest sunning himself. He looked so characteristic of his environment that the picture suggested "A Peaceful Reverie."



Sketch for a Residence
Westberg & Burke, Architects



Proposed Subway and Elevated Market Street, San Francisco [illegible] Reed & Co., Engineers

A Subway Without Excavation

By WALTER G. HOPKINS*

ABOUT once in so often some thinking but comparatively unknown engineer evolves an idea so bold and original, and withal so feasible and practical as to attract widespread attention.

Such an idea is embodied in a proposition recently made by Reed & Company to the city of San Francisco to construct a complete subway in Market street at an expense of some five and a half millions of dollars and to accept thirty-year, four per cent bonds in payment for the same, work to be completed within two years.

The plan, in brief, is to construct an elevated roadway over Market street from the Ferry building to Third street, where the boulevard intersects in the present level of Market street. The framework of this boulevard is entirely of steel and reinforced concrete, covered with glazed white tile. The roadways of the boulevard are wide and paved with asphalt, while the sidewalks are made up largely of prism glass.

The plan provides for a center park extending the whole distance with ornamental trees, shrubs and fountains. The upper boulevard level is exclusively for pedestrians and pleasure vehicles, while the electric road occupies its present position upon the lower level. A large number of circular switches are provided, however, opposite the central entrance of the Ferry building, with a dispatcher in charge, who, by the simple turning of a lever permits each car, as it arrives, to pass upon the proper switch and to stop only before a designated platform.

The heavy traffic of the water front passes either into the main subway or under it by means of a short sub-subway. At the several street crossings are entrances for the ingress and egress of passengers. Each of these corner stations is provided with lavatories and the usual requisites of modern depots.

A steam railroad track having connection with all the trunk lines now or hereafter entering San Francisco is provided for in the space adjoining the electric lines on the lower level, with switches leading into business houses en route and passing out into adjacent cross streets in the wholesale and manufacturing districts, thus providing perfect freight facilities. The space adjoining these steam railroad tracks is set aside for heavy cartage, thus permitting freight and goods for local delivery to be handled from the basement of all buildings en route.

Throughout the entire length of the subway no pedestrian is permitted to cross the track at grade, thus insuring a much greater speed in safety than could be otherwise obtained. At the juncture of Third, Market, Kearny and Geary streets a short cross-subway is provided to permit the cross-town electric lines to pass under without interference with the Market street lines.

The sewer, gas, water and salt water pipes and electric wires in conduits are all provided for in an improved manner beneath the lower level.

From an engineering point of view a peculiar advantage in the construction of the subway under the Reed & Company plan and one which at this time will strongly appeal to San Francisco citizens generally, is that this steel structure is tied in a most substantial manner to the buildings upon either side of Market street, thus uniting and strengthening

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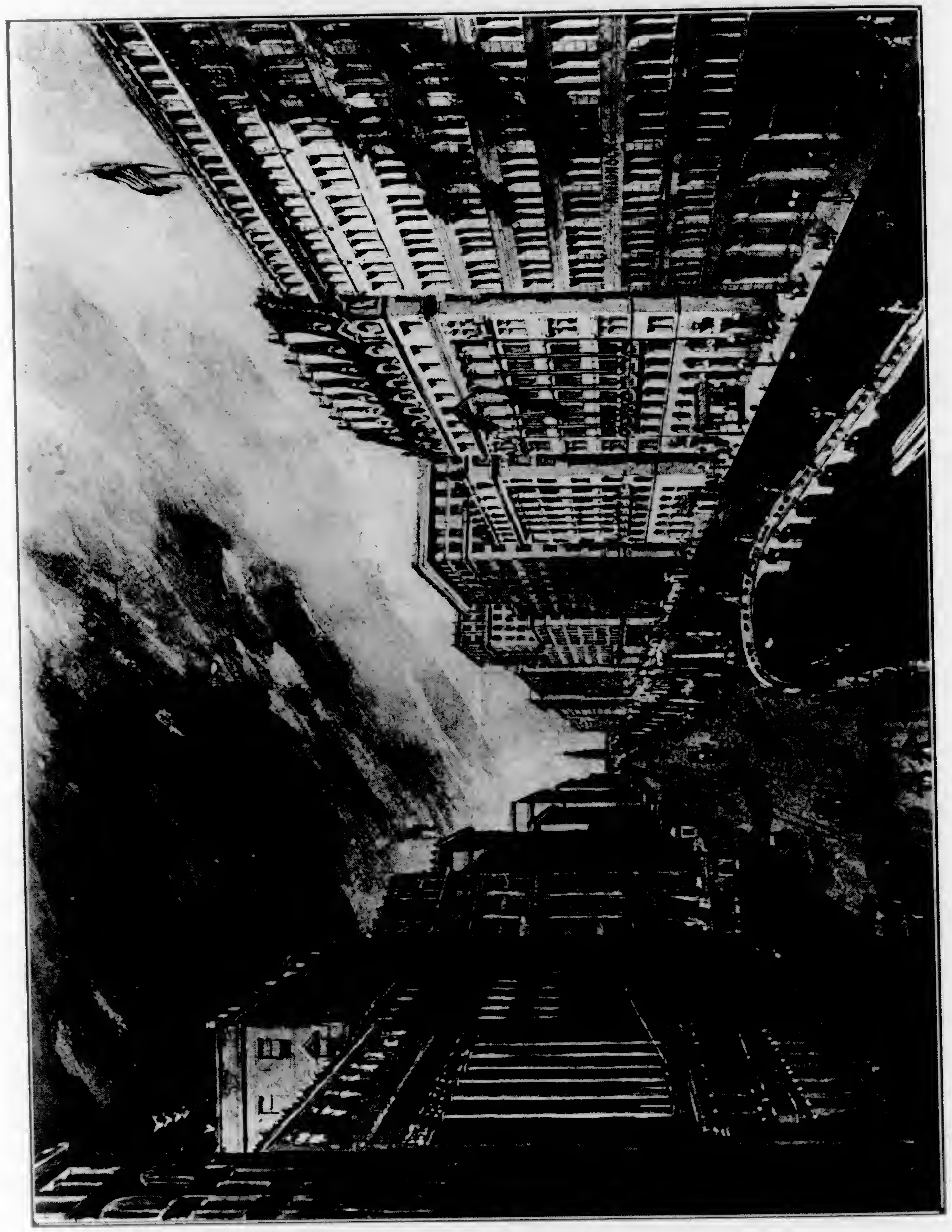
*Mr. Hopkins is Vice-president and Managing Director for Reed & Company with offices in San Francisco, Chicago, Santa Fe and Los Angeles.



Proposed Subway for Lower Market Street, San Francisco. Clay N. Burrell, Des. Reed & Co., Engineers

A Subway Without Excavation

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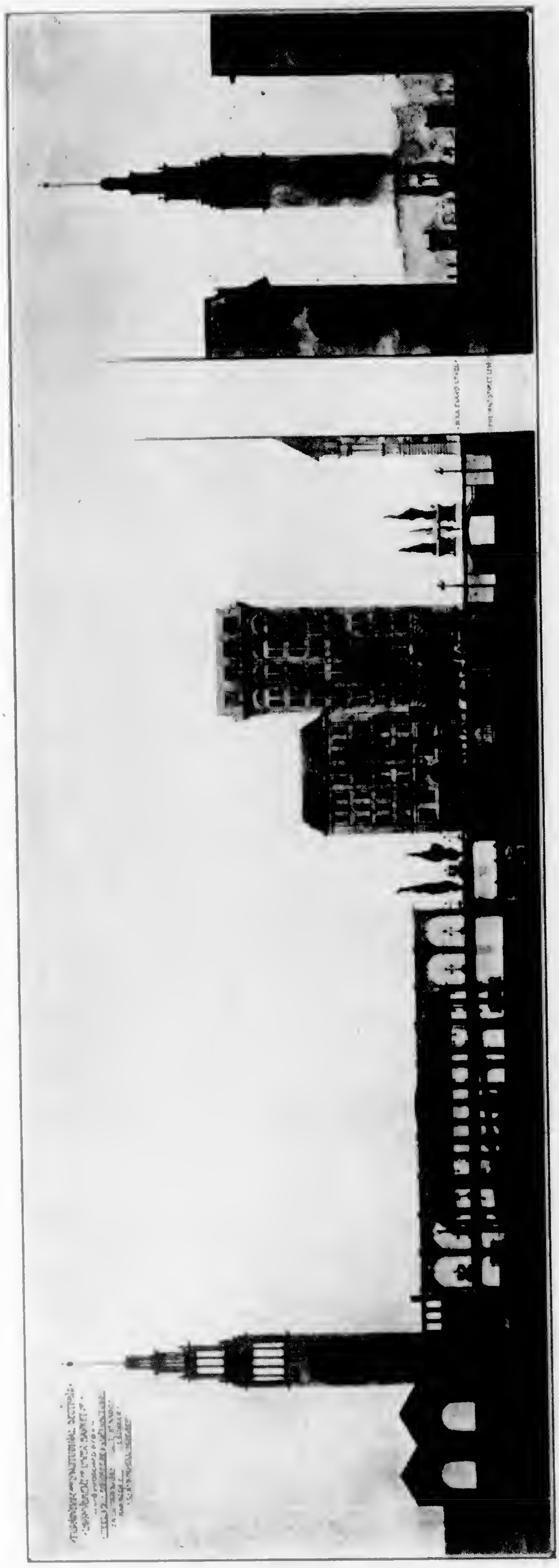
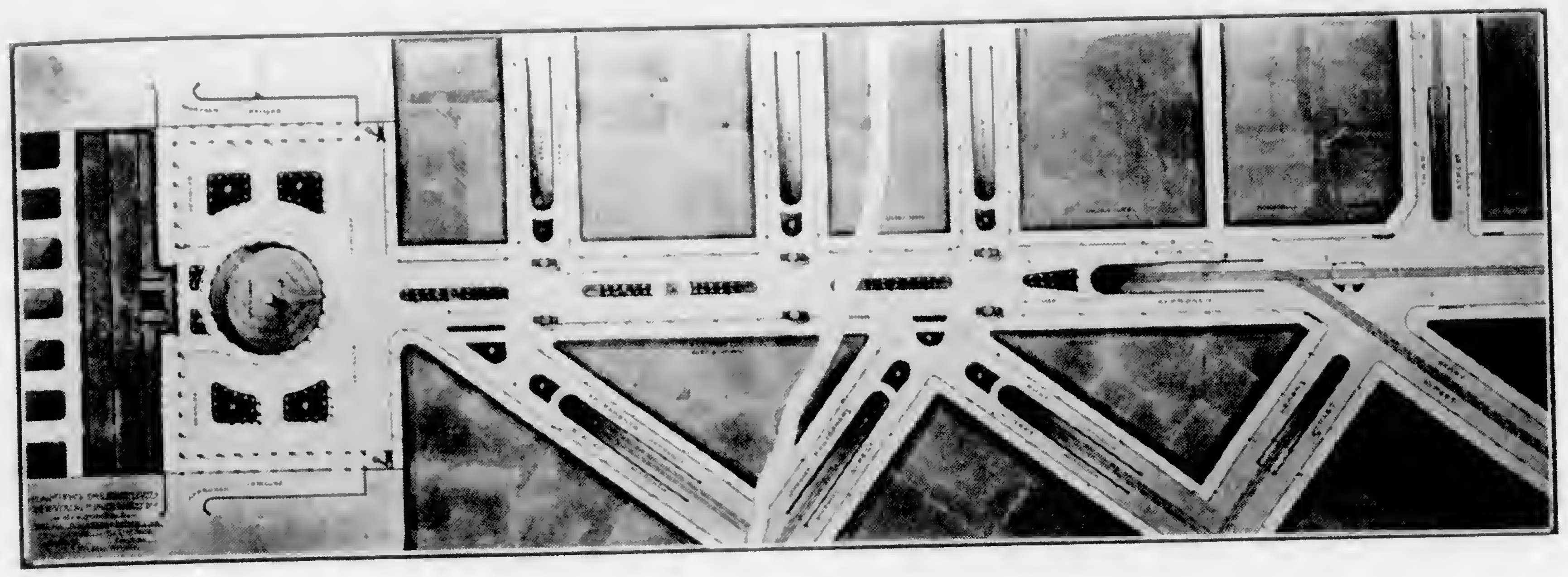


Transverse and Longitudinal Section, Improvement of Lower Market Street, San Francisco
Reed & Co., Engineers



Plan of Upper Boulevard Level, Improvement of Lower Market Street, San Francisco
Reed & Co., Engineers

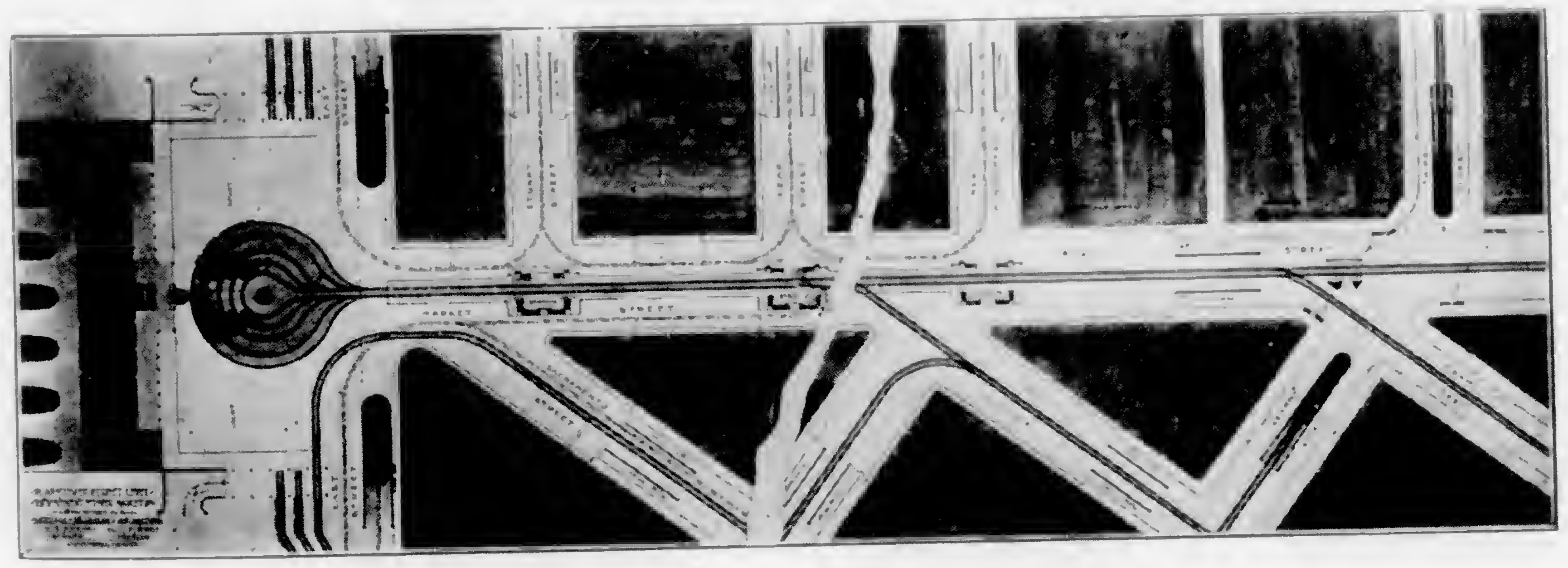
materially all buildings en route and rendering this section of the city practically impregnable to earthquakes and similar disasters.

To a person familiar with the conditions as they now exist the plan can hardly fail to call forth favorable comment. The grade of Market street from Third street to the ferry is ideal for an enterprise of this kind. By the proposed plan the boulevard intersects the Ferry building at the second floor, permitting the arched design of the building to be carried out in a magnificent Court of Honor.

Owing to the recent disaster there is not a permanent building en route which will interfere in the slightest degree with the carrying out of this plan.

In most cases, in the building of subways, millions of dollars have been expended for excavating; many millions more have necessarily been spent in caring for the existing water, gas, sewer pipes, conduits and other underground necessities, as well as insuring the safety of the overhead buildings. Under this plan all this great excavating expense is avoided.

There can be no question as to the urgent demand for something of this kind in San Francisco. Any person leaving the Ferry building must have noticed with alarm the chaotic conditions which exist in the confused mass of humanity dodging in and out among the various electric and cable cars, the trucks, the carriages, the automobiles and other vehicles, each endeavoring to discover some particular car, or reach in safety some point on the opposite curb. This plan absolutely cures that difficulty in the dividing of traffic.



Plan of Lower Street Level, Improvement of Lower Market Street, San Francisco
Reed & Co., Engineers

Subways, in spite of their great cost, have universally proved a most satisfactory and profitable investment financially; in the saving of life and limb and in the wonderful shortening of distances. It is difficult to estimate the many advantages or the wonderful beauty of this plan if carried out in its entirety; all that can in any way be construed as objectionable to the eye is cared for conveniently in the subway, while all that is pleasing is brought out in a most elaborate manner upon the boulevard. The architectural beauty of the grand court, with its heavy arch border carrying out the design of the present Ferry building, of which San Francisco has so long been justly proud; the magnificent dome over the street car platforms; the abundance of space in the plaza with its display of fountains, monuments, grass plots, trees, shrubs and flowers; the highly ornamental electric light fixtures and hydrants; the uniformity of all lines; the sidewalks; the curbs; the potted palms and other decorations; the wide and imposing roadways occupied entirely by pleasure vehicles—all are features which combine to mark San Francisco as the most up-to-date city in America, if not in the world.

The expense of this vast improvement is, we feel, almost insignificant when compared with its many advantages and can, under the terms suggested, be easily cared for without hardship to any individual.

Whether San Francisco, in her stricken condition, will feel that she can grasp this opportunity remains to be seen—we sincerely hope that she may.

The drawings shown herewith were prepared under the writer's personal direction by Mr. Clay N. Burrell, the well-known architect of Oakland, while the actual surveys and estimates were prepared under the supervision of Mr. L. T. McNabb, the building superintendent for Reed & Company.

* * *

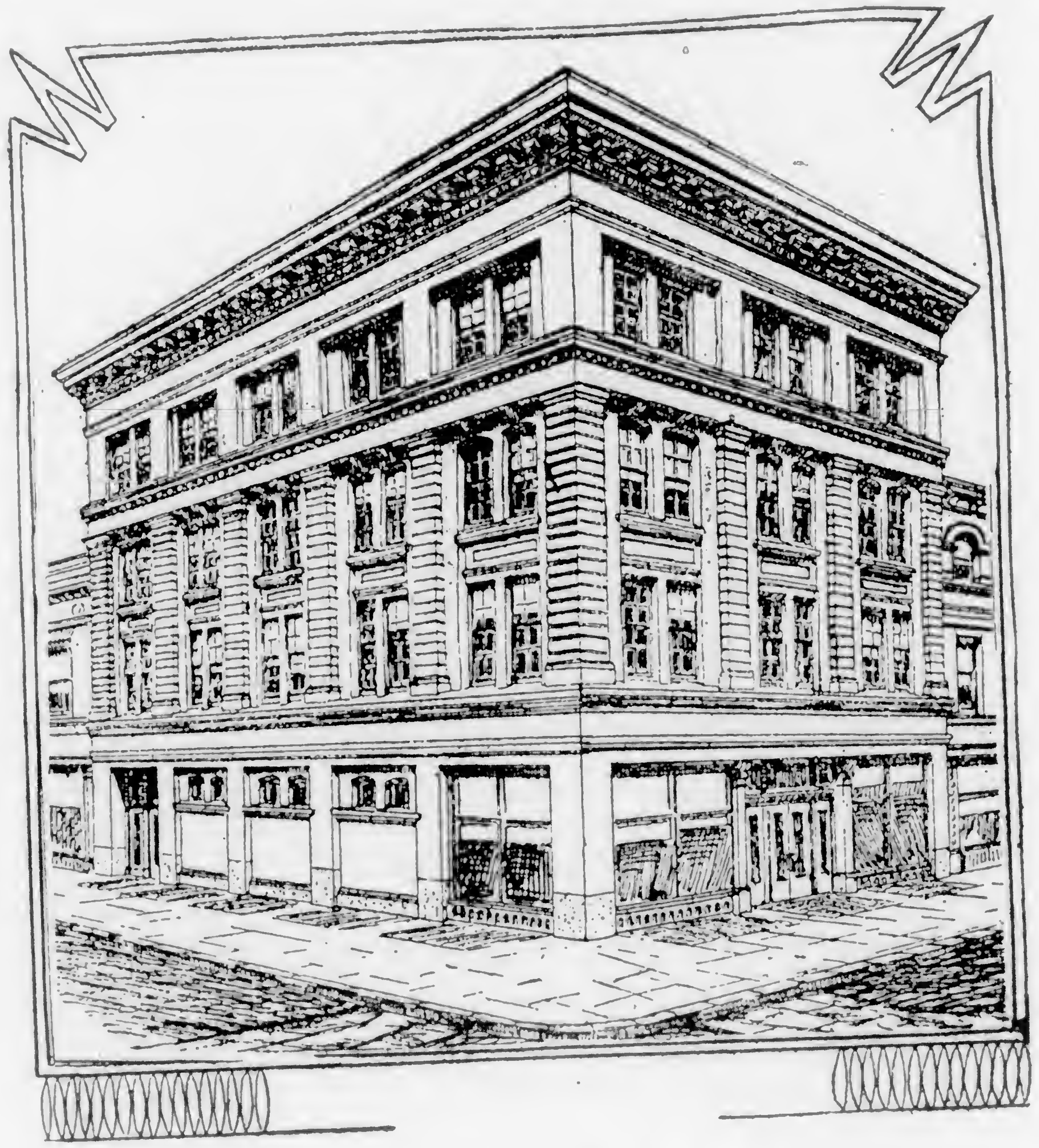
Houses Built While You Wait

MR. THOS. A. EDISON'S latest role is that of a benefactor to mankind, and best of all it is the working man who will derive the most benefit. His latest step consists in molding houses out of concrete in a single casting, complete in every detail, in four days. The method of procedure is described briefly as follows:

An architect will be employed to design dwelling houses of different designs; metallic molds will be made to correspond. The mold for each house will be made in detachable parts that can be screwed together easily to form an entire house. The mold for the whole house is set up, and concrete pumped into every nook and cranny. After four days the parts of the mold will be unscrewed and removed and the solid concrete house will remain.

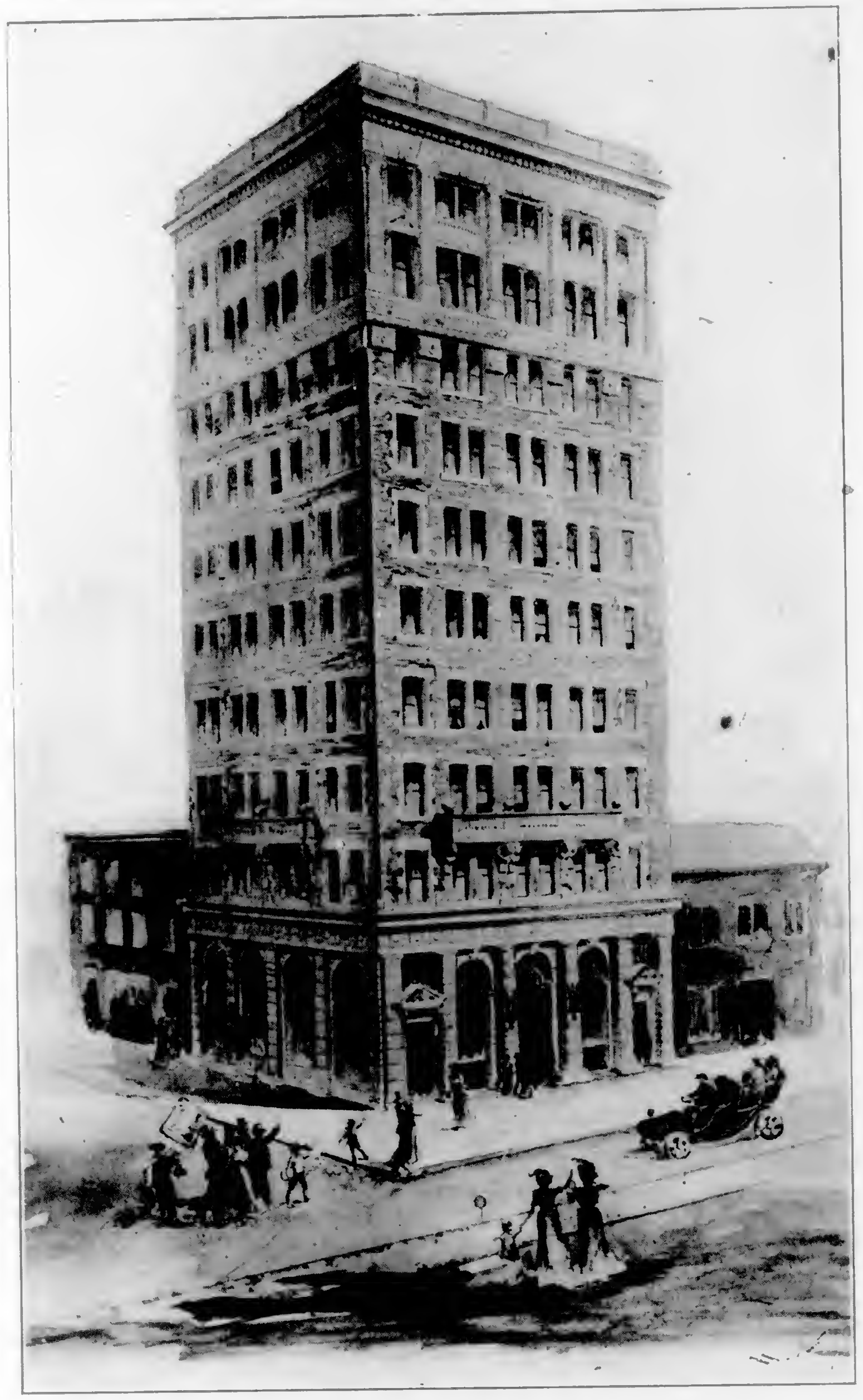
Mr. Edison claims that the house will be so complete that dormer windows, chimneys, spouts, inside cupboards, banisters, mantel pieces and even bath tubs will be formed in the cast in which the house proper will be made. Even the plumbing and gas piping will be of concrete and molded in the original cast. From each mold, the first cost of which with all its parts, is estimated at $25,000.00, an unlimited number of houses may be produced, because the parts of the mold may be detachable. It will be portable and one mold may be sent with little difficulty from town to town. It is claimed that about ninety houses could be built in one year by the use of a single mold, at a cost of $500.00 to $600.00 apiece.—Rock Products.

For The New San Francisco



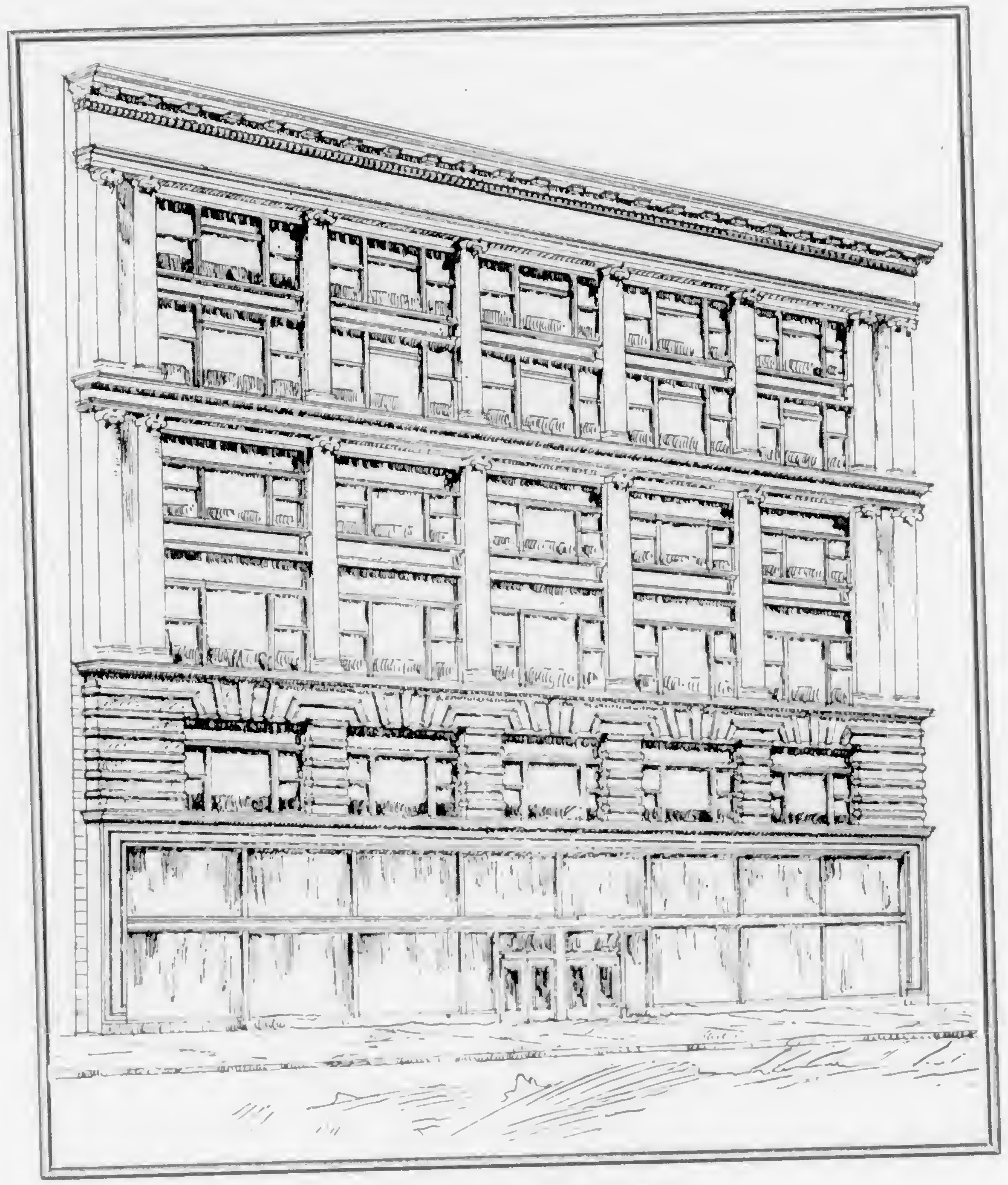
Bank and Office Building for Chas. A. Son, San Francisco
Clinton Day, Architect

For The New San Francisco

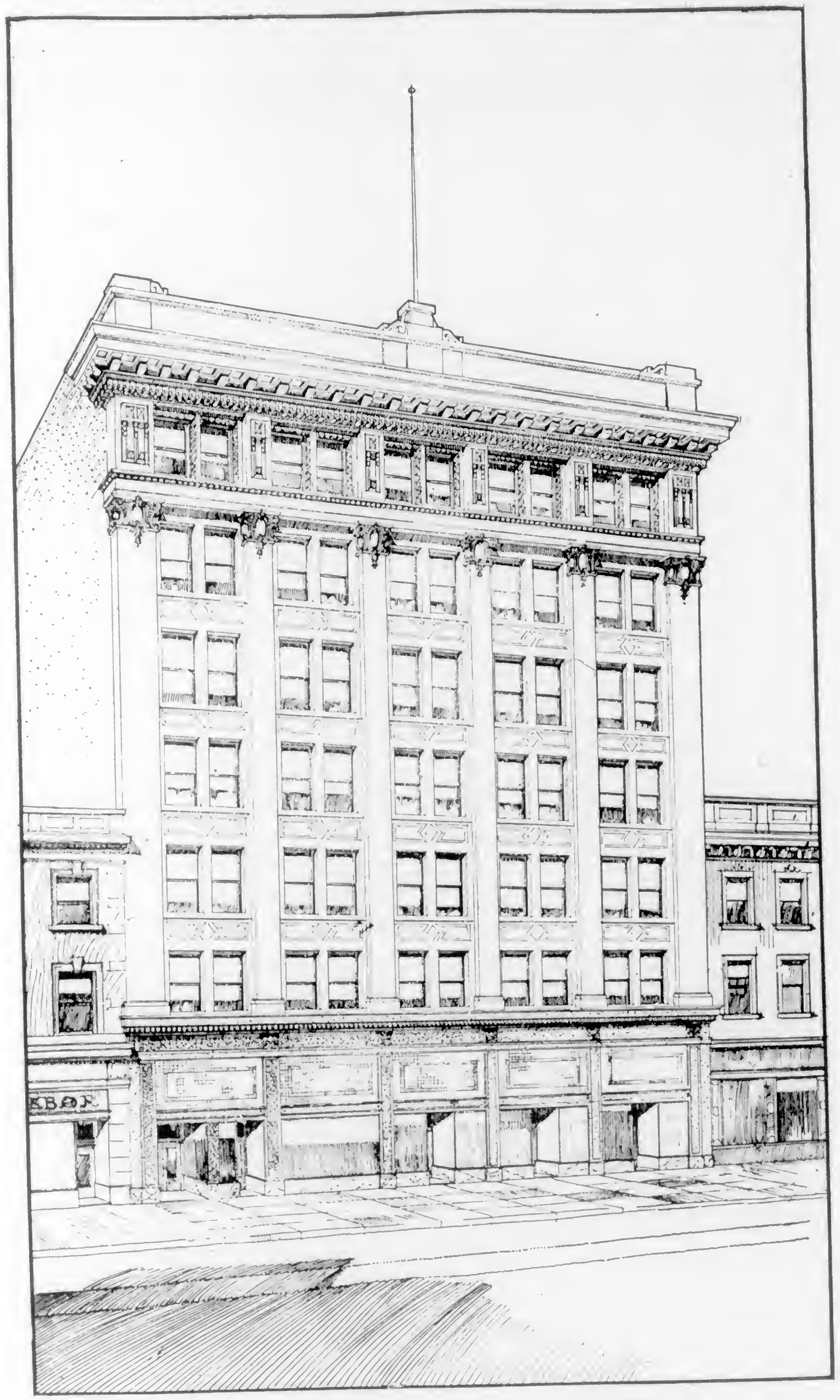


Accepted Design for Bank of Italy, San Francisco
Frank T. Shea, Architect

For The New San Francisco



The Hale Building, San Francisco
Reed Bros., Architects



The Macdonough Building of Reinforced Concrete, San Francisco
William Curlett, Architect

Change San Francisco Fire Districts

By P. H. BOSWORTH

THE history of all fires, both large and small, where the class A construction has been involved, has proved that fireproof buildings will burn, and burn readily, and all the fire-resisting qualities that architects and engineers can devise will prove ineffective so long as the building laws will permit a wooden building to be erected adjacent to or even across the widest street from a fireproof structure.

By a wooden building is meant a class C structure, which, to all intent and purposes, is a wooden building, being, as it is, merely a brick shell filled with wood. It is most certainly possible to add more fireproofing qualities to class A buildings than they now possess, but only at the expense of comfort and elegance and architectural beauty. This is not a condition to be desired if it can possibly be avoided, and it can be avoided by some such arrangement of the fire limits suggested in the following: To make the class A building as it stands today absolutely fireproof it will be necessary to divide the fire limits into districts: Class A district, class B district and class C district.

This does not change the boundary of the fire limits in any respect; it merely means that in a class A district no class B or C buildings can be built; in class B district no class C buildings can be built; however, this does not prevent class A buildings being built in class B and C districts, or class B buildings in class C district.

The district should be arranged something as follows: Class A district, both sides of Market street, from First to Ninth; both sides of each street branching into Market street for varying districts to be decided later on, and no one or both sides of streets parallel to Market and intersecting the streets branching into Market street where these streets are in the class A district for one or more blocks.

Class B construction should surround the above formation one or more blocks deep as a barrier against fire from the class C district. The class B district should have more stringent regulations, making the buildings at least semi-fireproof.

The balance of the fire limits could be given over to class C construction, with this exception, that no business or manufacture of a hazardous nature be allowed within the fire limits.

In effect this arrangement would mean that no fire could possibly start in the district given over to class A construction. Any danger from fire therefore would have to come in from the outside through the class B district. The danger of fires gaining headway in the class B district is slight, as the semi-fireproof construction is a great retardent; therefore the only danger from fire to the class A and B districts would come from the class C district.

A fire starting in the class C district would have very little chance, even under the worst conditions, as there would be no all-frame structures to spread the flames, and if enough solid walls were interposed between buildings, each building in class C district to have at least one or two solid walls as necessary from top to bottom of building without an opening, as a fire check, the flames could be confined, without water, to one or two buildings or at the most to one block, but allow that a fire gained enough headway in the class C district to reach the class B district it would have to burn through two or more blocks of semi-fireproof construction before it could reach the class A district, which is a practical impossibility; but stretching the imagination to the utmost, if a fire did work its way through the class B district it would necessarily be so weak that it would have absolutely no effect on the class A construction, even as it is now built.

This plan then would obviate the necessity of disfiguring class A buildings with wire glass, fireproof shutters and metal-encased doors, casings, window frames, etc., which at the best are extremely ugly, and would make it possible to continue finishing the finest buildings with the handsomest materials as formerly.

In the class A district would probably concentrate the wealth and business of the city, raising real estate values and rent accordingly, which fact would tend to compensate the property owners for being compelled to erect the most expensive type of building on their present holdings.

It would also be advisable to segregate certain businesses and manufactures of an extra hazardous nature to certain districts where additional safeguards could be thrown around them and where the damage they might do in case of fire would be confined to their own properties. By allowing them to mix promiscuously with other businesses and habitations they stand as a constant menace to adjoining property and have the effect of raising insurance rates on all property in their immediate neighborhood.

This plan would probably have the effect of lowering insurance rates in the fire districts and might have a tendency to keep the insurance rates down throughout the entire city.

* * *

The Man Behind the Pick

There has been all kinds of gush about the man who is "behind"—
And the man behind the cannon has been toasted, wined and dined.
There's the man behind the musket and the man behind the fence,
And the man behind his whiskers and the man behind his rents;
And the man behind the plow and the man behind the hoe;
And the man behind the ballot and the man behind the dough;
And the man behind the counter and the man behind the bill;
And the man behind the pestle and the man behind the pill;
And the man behind the jimmy and the man behind the bars;
And the Johnny that goes suping on the stage behind the stars;
And the man behind the kisser and the man behind the fist;
And the girl behind the man behind the gun is on the list;
And the man behind the bottle, and when they were short of men,
There was some small rhymster warbled of the man behind the pen;
But they missed the honest fellow, and I'm raising of a kick,
That they didn't make a mention of the man behind the pick.
The man behind the pickax is the one we seldom know;
He's the only man in Christendom who never has a show.
You will find him in the brickyard, you may find him picking bricks,
But you fail to see him hold a job controlled by politics,
For he's the man that's always behind, behind, behind,
The pickax builds his muscle, while the shyster steals his mind;
He's the man that just a-coming; we can see he's learning fast,
For he's going to teach the grafter that his days are near the last.
—The Clay Worker.

Notes on the Construction of Steel Frames for Buildings *

By J. D. GALLOWAY

IT IS my intention to enter into only a few of the various matters pertaining to the design of a steel frame. The ordinary requirements for the design of the steel frame for a building are matters of common knowledge, and need not be dwelt upon here. The thing that we have to talk about is as to whether or not we have learned anything from the earthquake. However, a few other points might be mentioned, as indicating my preferences in this line of work.

I never use beams less than six inches in depth.

I do not use any metal less than 5-16ths of an inch in thickness. This applies particularly to the webs of channels. In my opinion anything less than 5-16ths of an inch in thickness is entirely too light. This is especially true when it comes to the riveting of brackets to the columns as there, in the case of thin metal, the bearing of rivets governs instead of the shear. Upon examining some of the wrecked buildings in the city, one will notice how columns made up of thin iron have torn apart like paper. Another reason for using metal not less than 5-16ths of an inch in thickness is that such thin metal usually occurs in small sizes and members near the top of a building. On such floors, the floor beams are of the same size as below; hence such things might come about as the attempt to fasten a fifteen-inch or a twenty-inch I beam to a six-inch channel column. The web of a six-inch, eight-pound channel is 2-10ths of an inch in thickness or about midway between 3-16ths and 1-4 of an inch. In my judgment this would be entirely wrong.

Personally, I have no use for cast iron columns. With proper safety factors they are not as cheap as steel. It is impossible to design brackets for beam supports of more than 40 per cent of the column strength and it is impossible to provide any form of connection that provides adequate bracing.

Another point which I might mention as indicating my line of practice, is the size of columns in the upper stories of buildings; theoretically, one should be allowed to diminish the size of columns as the upper stories of the building are approached. I do not do this for a number of reasons. There will, of course, be a slight saving of material should smaller members be introduced, but the connection of heavy beams to small sized columns is generally a very difficult matter. Again, in the wall columns of buildings, especially those in the fronts, there is generally a heavy eccentric load in the upper stories, due to the cornices and belt courses. I have had a number of cases where by properly considering the eccentric load of a stone cornice the area of the columns required for the eccentric load was as much as from three to four times the area required for the dead load alone.

The principal thing which engineers should learn from the earthquake is the absolute necessity of a thorough bracing of buildings. I will own up to some cases where I have designed buildings in which the proper consideration of bracing was not taken. However, in buildings in which the height was much over the least horizontal dimension, I have always introduced bracing.

In the Mutual Savings Bank there are two lines of portal bracing

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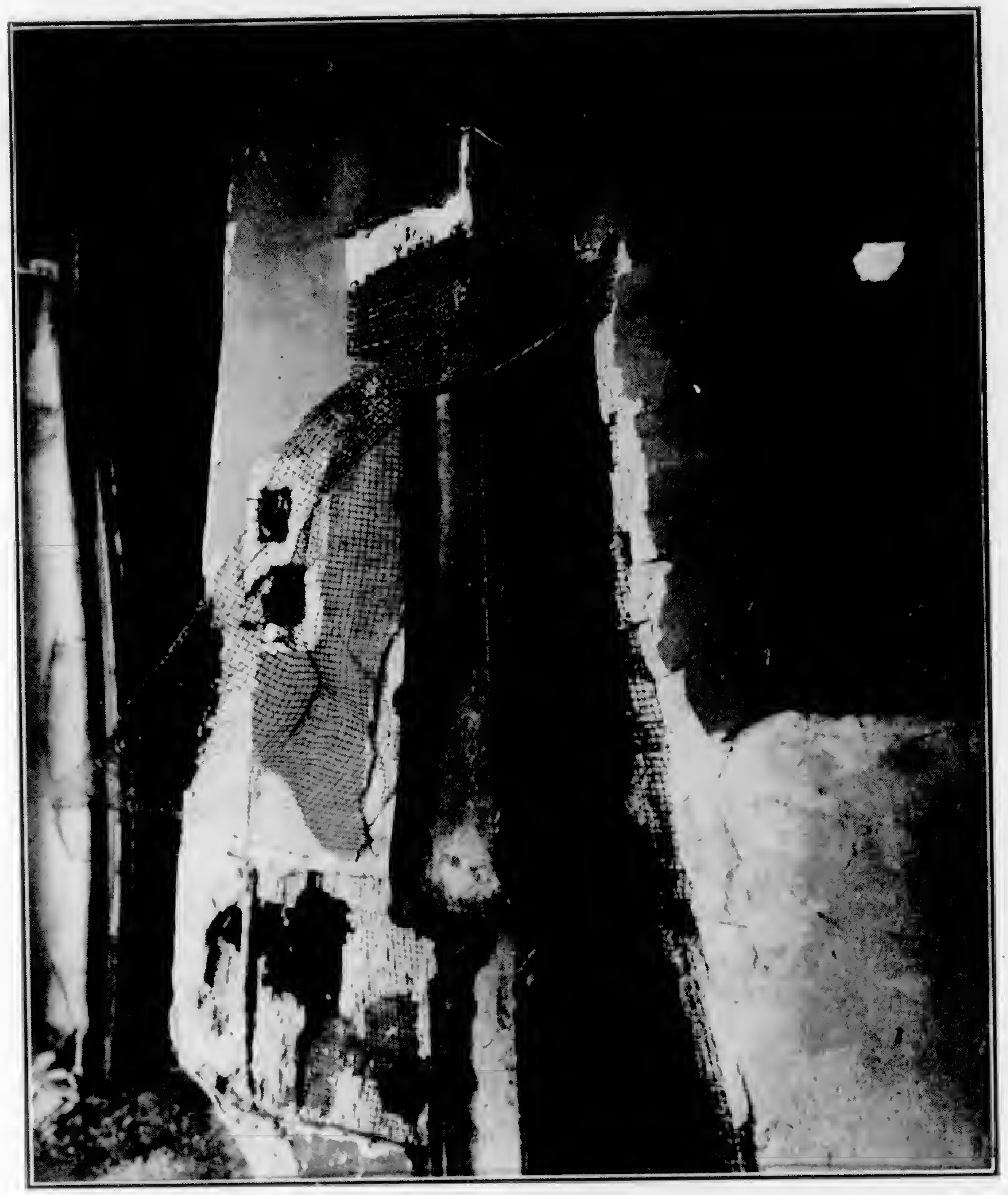
*Paper read before the Structural Association of San Francisco.



Buckled Column in the Hotel Alexander, San Francisco

and two lines of cross bracing carried from the top of the building into the basement.

In the Shreve Building, which is not so high, in respect to its base, there are two lines of portal bracing.

In the Atlas Building, ten stories high, sixty feet wide on the front, the wall girders are connected at top and bottom to the columns, and the interior girders all have knee braces.

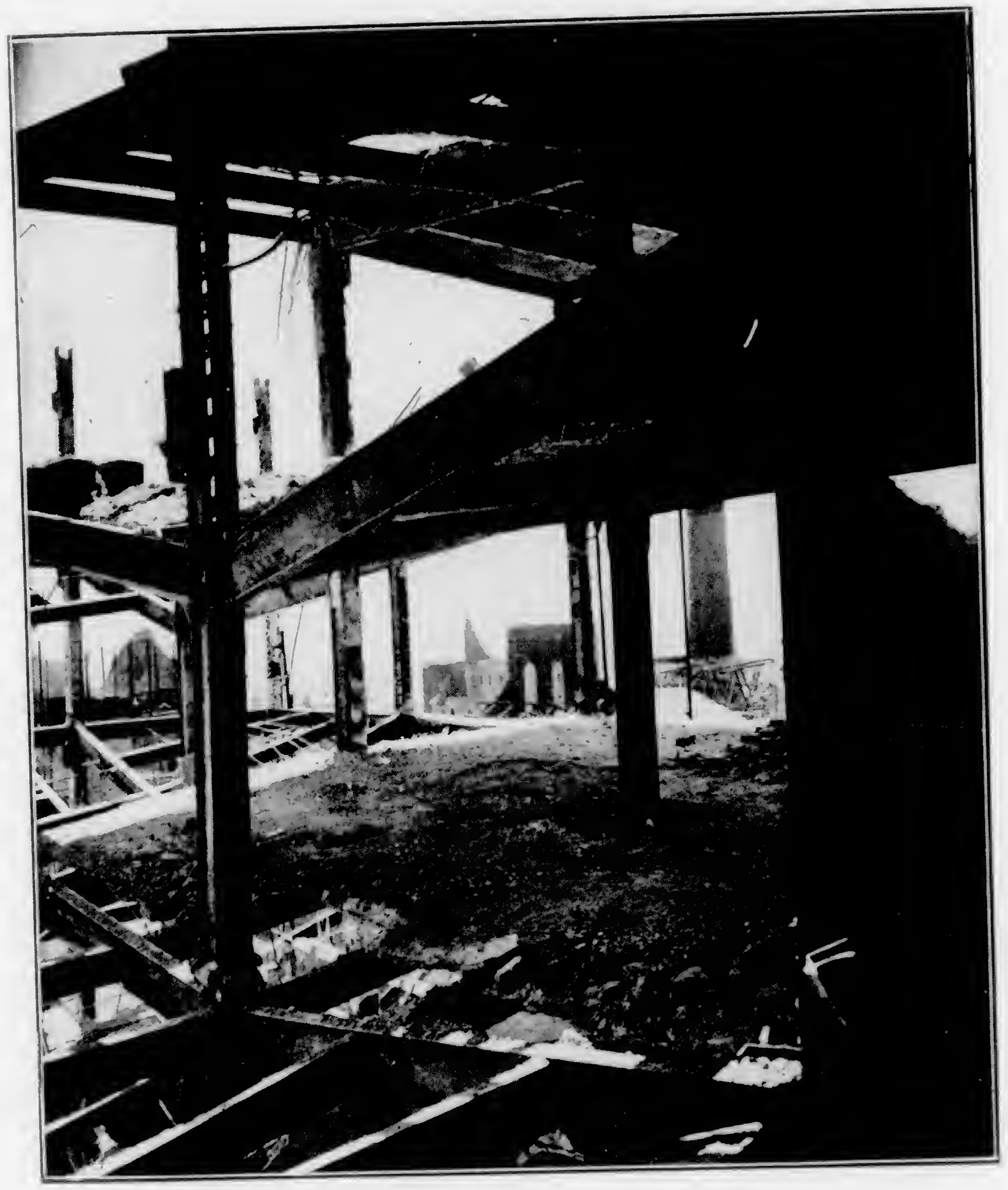
None of these buildings were found out of plumb after the earthquake.

In the St. Francis Hotel, where the height is not a very large multiple of the breadth, it was thought sufficient to depend upon the stiffness of the floors, and in the new portion bracing was introduced in a number of places. It remained vertical during the earthquake.

Other engineers have recognized the necessity of portal bracing in early days in San Francisco, the most notable evidence of which is that of the Claus Spreckels Building. In this building there are eight lines of diagonal bracing, made of adjustable eye bars, carried from the sixteenth floor to the foundations. Above the sixteenth floor, there are three sets of this bracing carried into the dome. In addition, from the third floor down, portal braces are introduced on each side at the four corners. In addition to this bracing, all of the main beams connecting the columns are fastened with knee braces.

The subject of wind bracing is one on which the engineer always clashes with the architect. The architect endeavors to secure as many openings as possible, both on the exterior and interior of the building, and this renders it extremely difficult to introduce diagonal bracing. However, in the light of recent experience, engineers should insist upon having wind bracing in buildings of even moderate height. I believe that if diagonal bracing be introduced, running from floor to floor much good could be done by the use of deep girders in the spandrel sections, connected to the columns by knee braces as large as the architectural features will allow for.

There are no means of calculating the stresses in a structure due to an earthquake, but, judging from the behavior of buildings such as the Shreve Building or the Claus Spreckels Building, I would say that if a building is properly designed for a wind pressure of thirty pounds



Showing Steel Girders on the Fifth Floor, Kamm Building, San Francisco

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Showing Steel Girders on the Fifth Floor Kamm Building, San Francisco per square foot on its superficial area, that it would be sufficient to withstand an earthquake of an intensity equal to that of April 18th.

I am inclined to think that in San Francisco this question of bracing is the most important one with which structural engineers must deal. They should examine critically all of their connections with an endeavor to make them as rigid as possible. Columns should be broken at every other story and should extend through at least two stories. They should be anchored to the foundations. The wind bracing should extend from top to bottom and should not be cut in two at the first story in order to make a store look attractive. If the wind bracing is left out of the first story, it might as well be left out of the entire building. It is an attempt to sustain a weight by a chain, one of the links of which is removed.

I regard the introduction of concrete floors in buildings as a very efficient means of bracing them. Terra cotta tile does not possess the rigidity of concrete, and hence does not add that factor of safety.

In conclusion, I would urge upon engineers the necessity of making all parts of a structure strong enough. I can see no reason why engineers are called upon to shave the amount of steel in a building. In all my experiences with architects I must say that I never was required in any way to cut down the amount of steel. Very little is saved by thinning out the metal or by reducing the size of columns in upper stories. Very little is saved by the omission of adequate bracing. If the engineer is not called upon to do this by some exterior influence, he should by all means endeavor to make the structure rigid. I do not mean by this to use steel indiscriminately, but to wisely proportion the structure, and above all things to pay attention to the joints.

Kappa Alpha Fraternity House, Stanford University
Chas. E. Hodges, Architect

A Primary School at Palo Alto
Chas. E. Hodges, Architect

Some Stanford University Residences

By CHARLES EDWARD HODGES, Architect*

THE accompanying photographs partially illustrate the residential portion of the Stanford University campus. The houses are built on lots leased from the University at a ground rent of $100 per annum on a lease of ten years, which, by the sanction of the Board of Trustees, can be extended indefinitely.

The minimum cost of residences to fraternities has to be $6000 and to members of the faculty $4000. Two thousand dollars has to be raised, in addition to money borrowed, by all fraternities before any lot can be leased. The fraternity is then incorporated, and an association formed for the disposal of the shares to private individuals willing to loan the money.

The principal features of a Fraternity House are a commodious reception hall, large dining room, library, and combined den and billiard room. All these rooms are so planned as to admit of good dancing space when thrown open, porches which can be enclosed with burlap, can also be made available for dancing. Each house usually contains nine or ten bedrooms on the second floor, eighteen members being about the average number of each sorority. A large chapter room, otherwise known as the "mystery of mysteries," is located either in the basement or attic. Two large bathrooms are sufficient as the "shower" is now most favored. Wainscoted walls are used plentifully, as they have proved a saving on the "wear and tear."

The Freshman at Stanford usually passes his first year in the large Dormitory, otherwise known as Encina Hall, where the old-time initiation of the Bathtub is still indulged in. The second year the Sophomore is considered eligible to be counted as a Fraternity man, and being duly elected, he is initiated with the various stunts usually performed on the public highway for the benefit of his fellow students, so that the student soon learns that sojourn under the red tile roofs is not all hard work.

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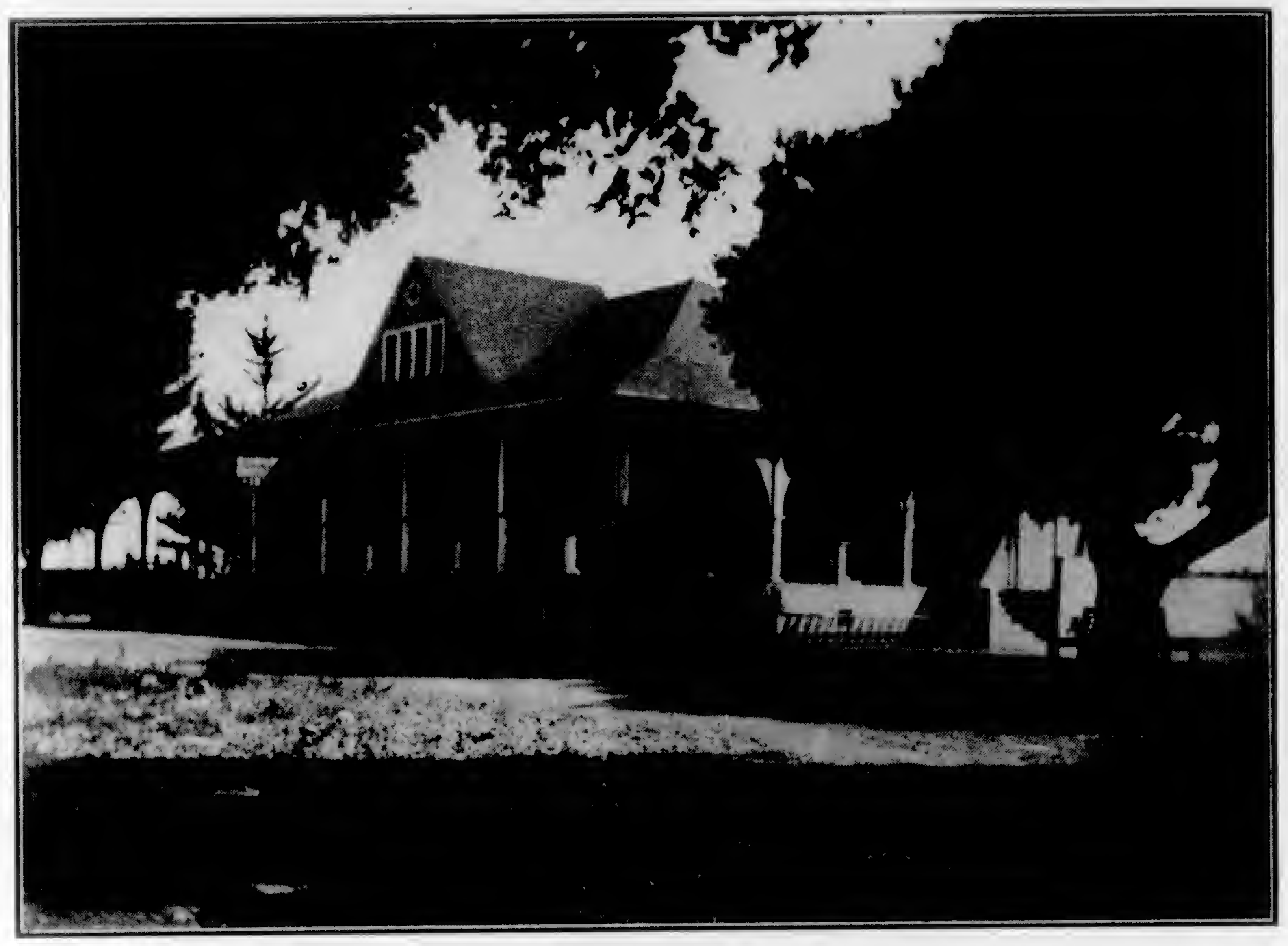
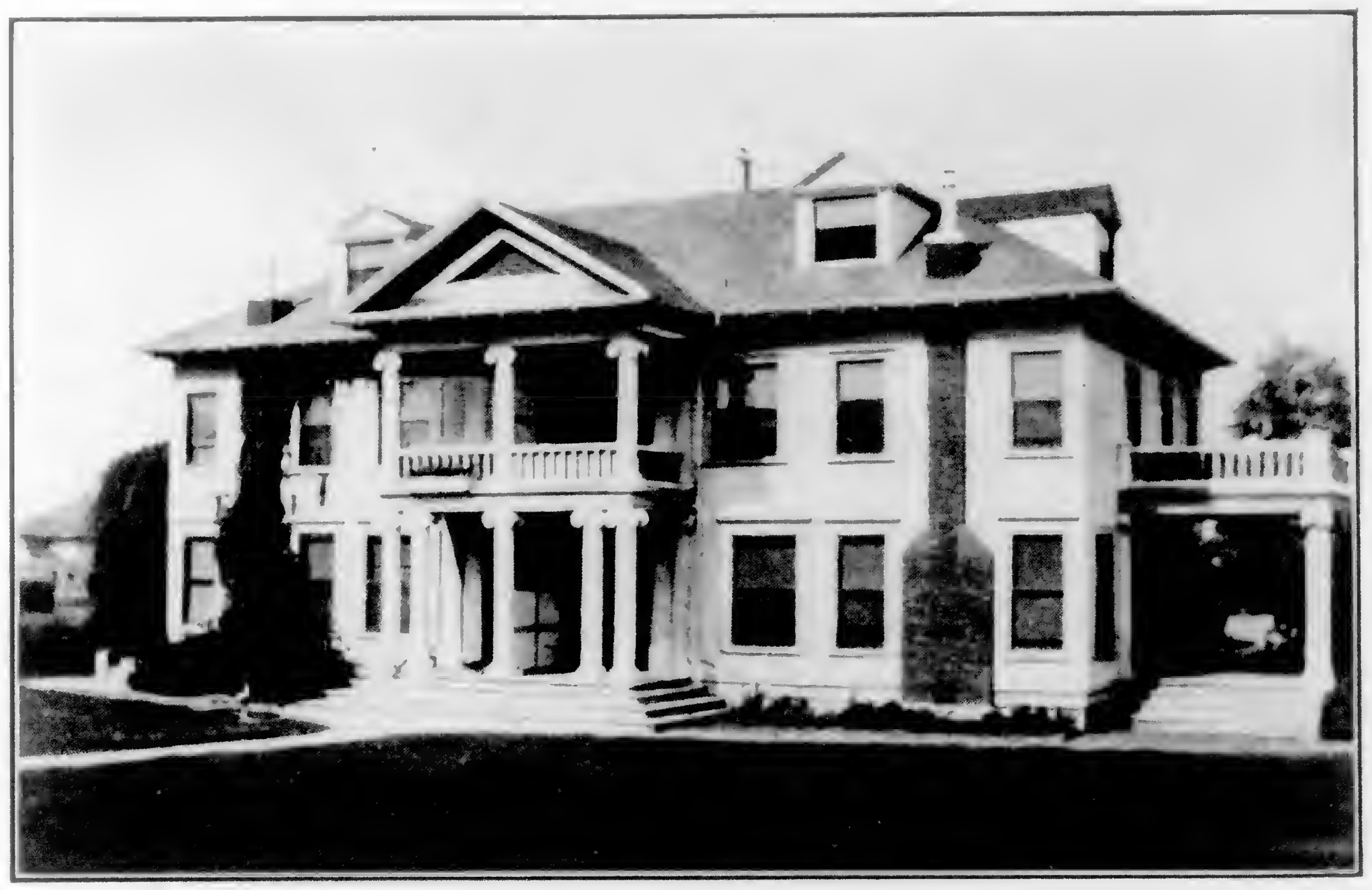
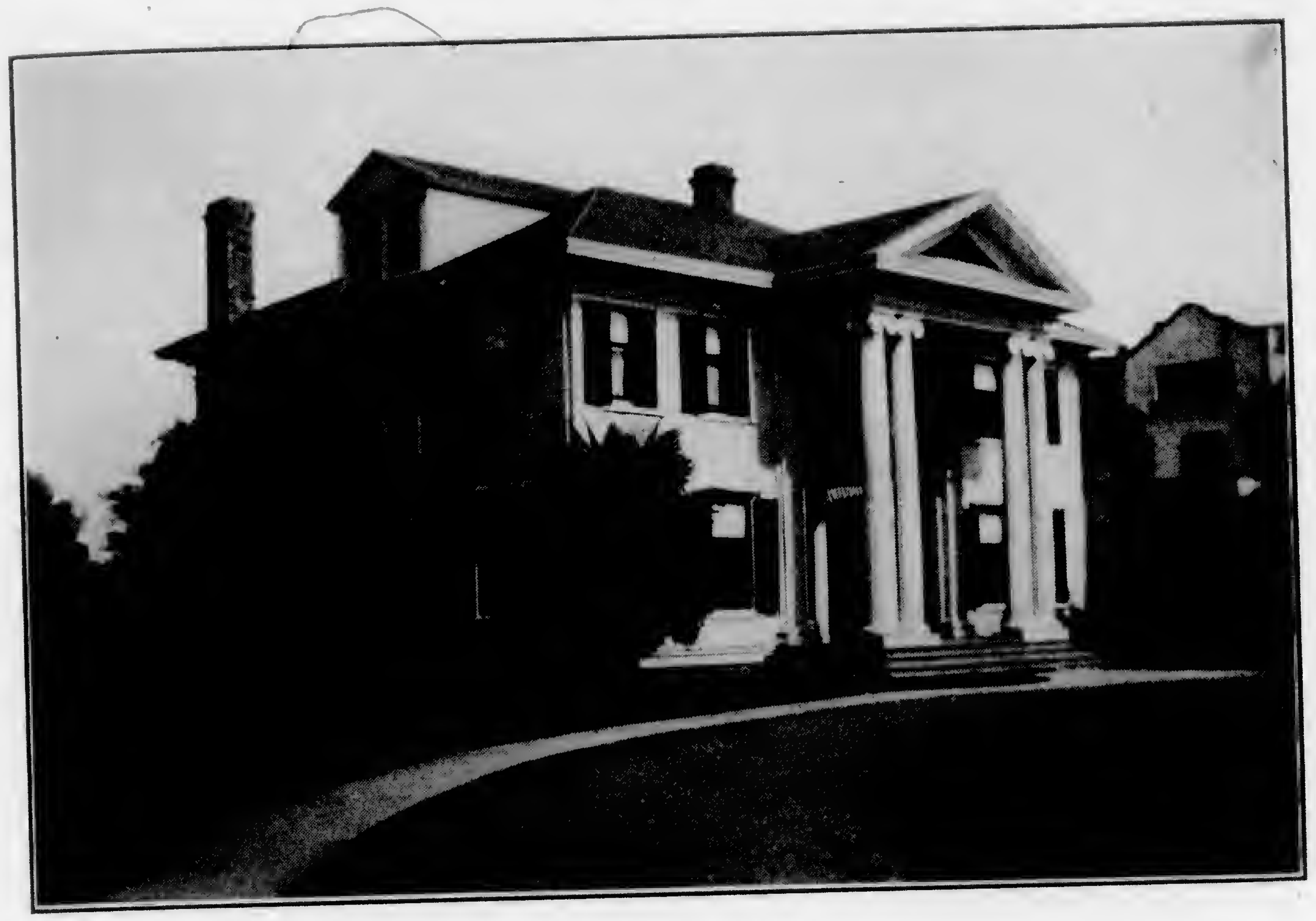
*Mr. Hodges was formerly resident architect at the Leland Stanford University.



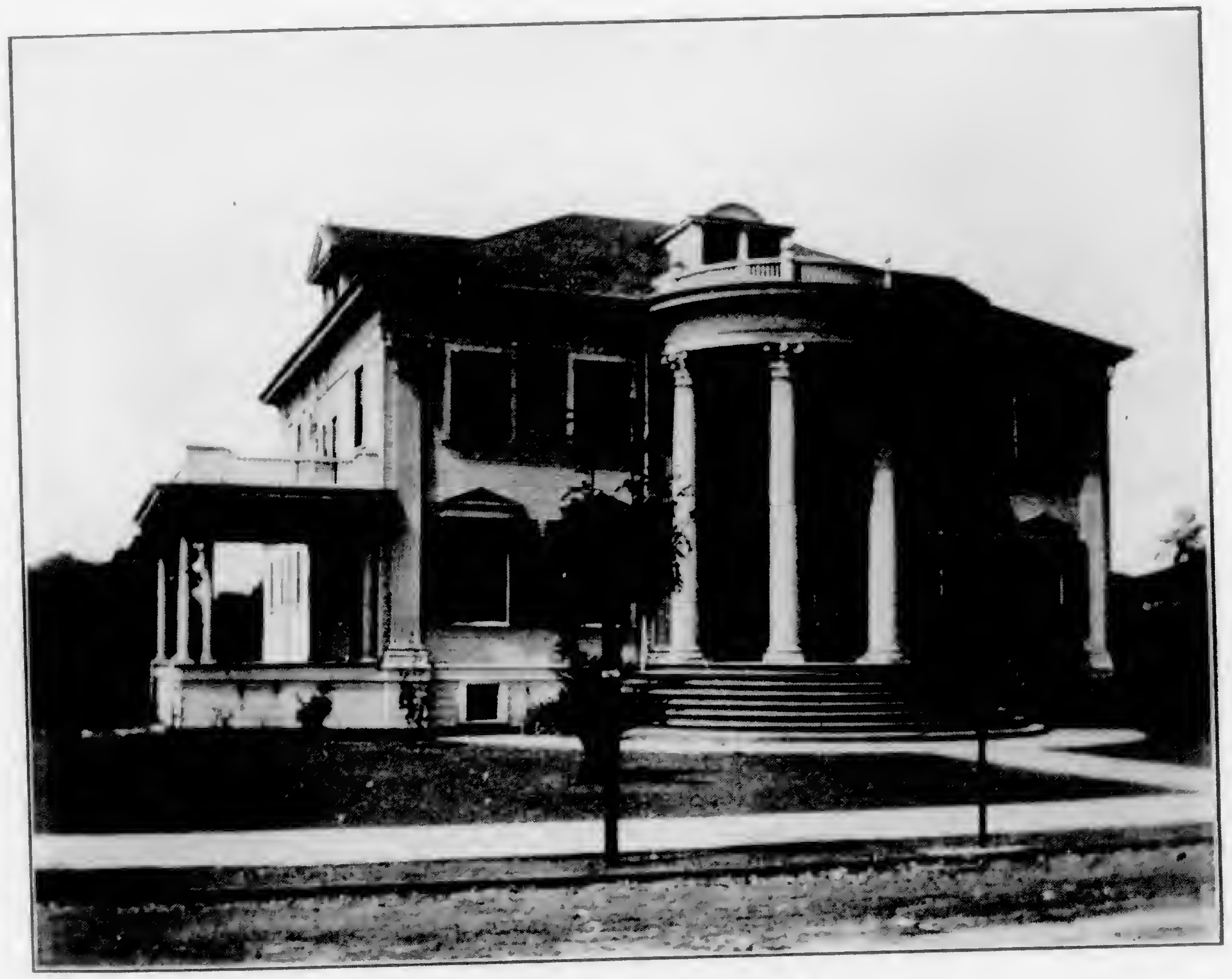
University Inn, Stanford
Chas. E. Hodges, Architect



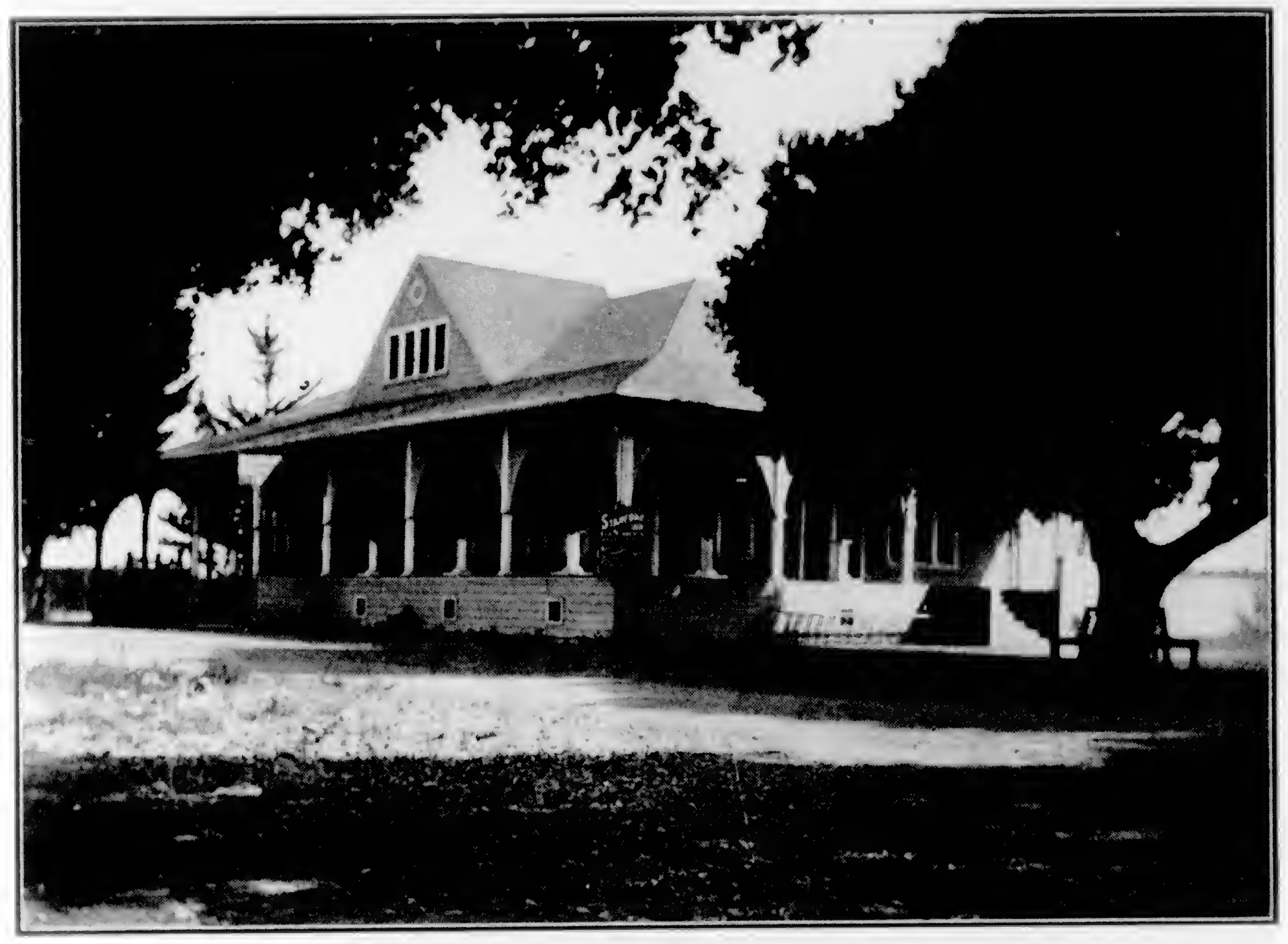
A Professor's Residence, Stanford
Chas. E. Hodges, Architect



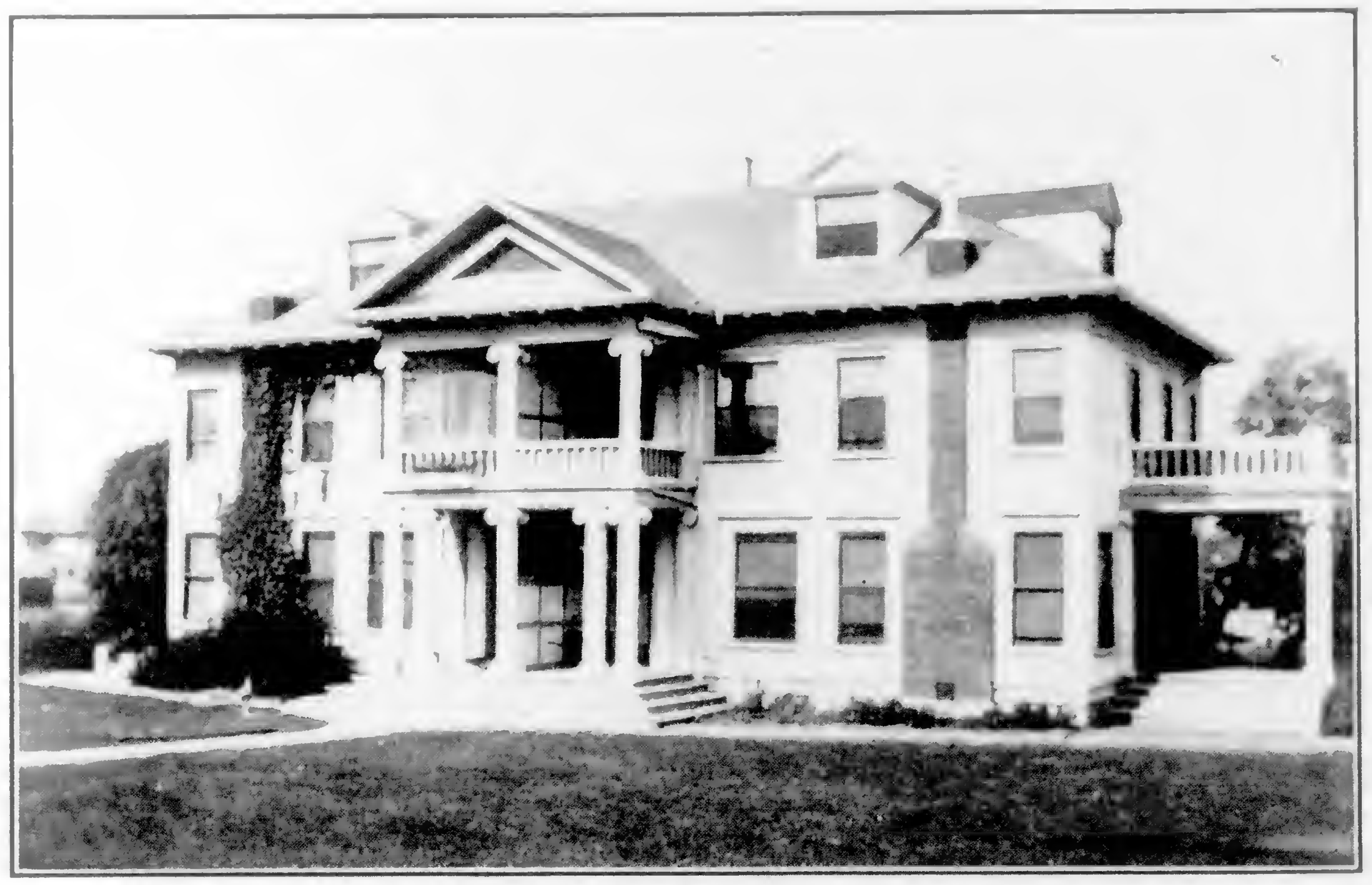
Residence of O. W. Dunn, Stanford
Chas. E. Hodges, Architect



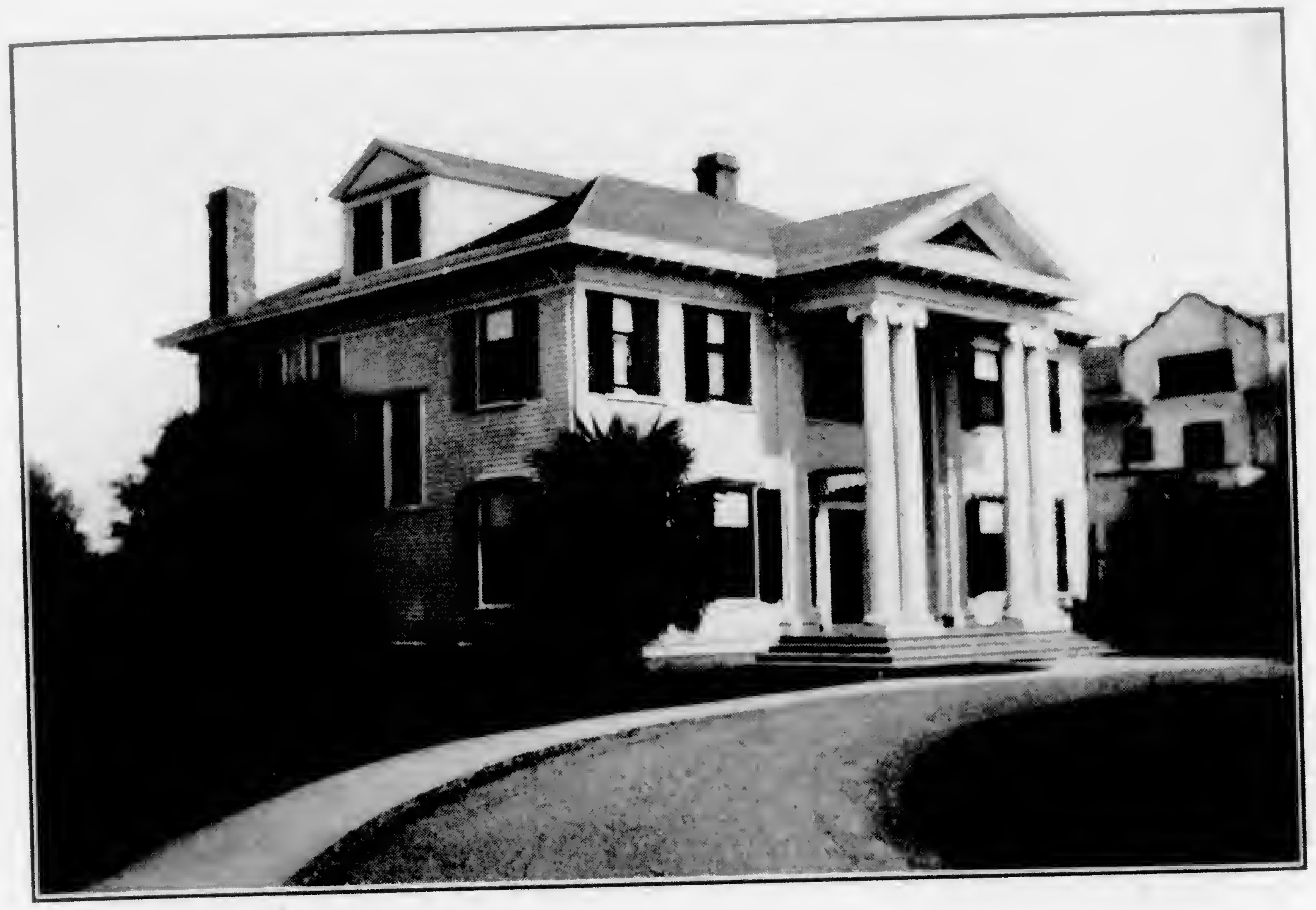
Beta Psi Fraternity House, Stanford
Chas. E. Hodges, Architect



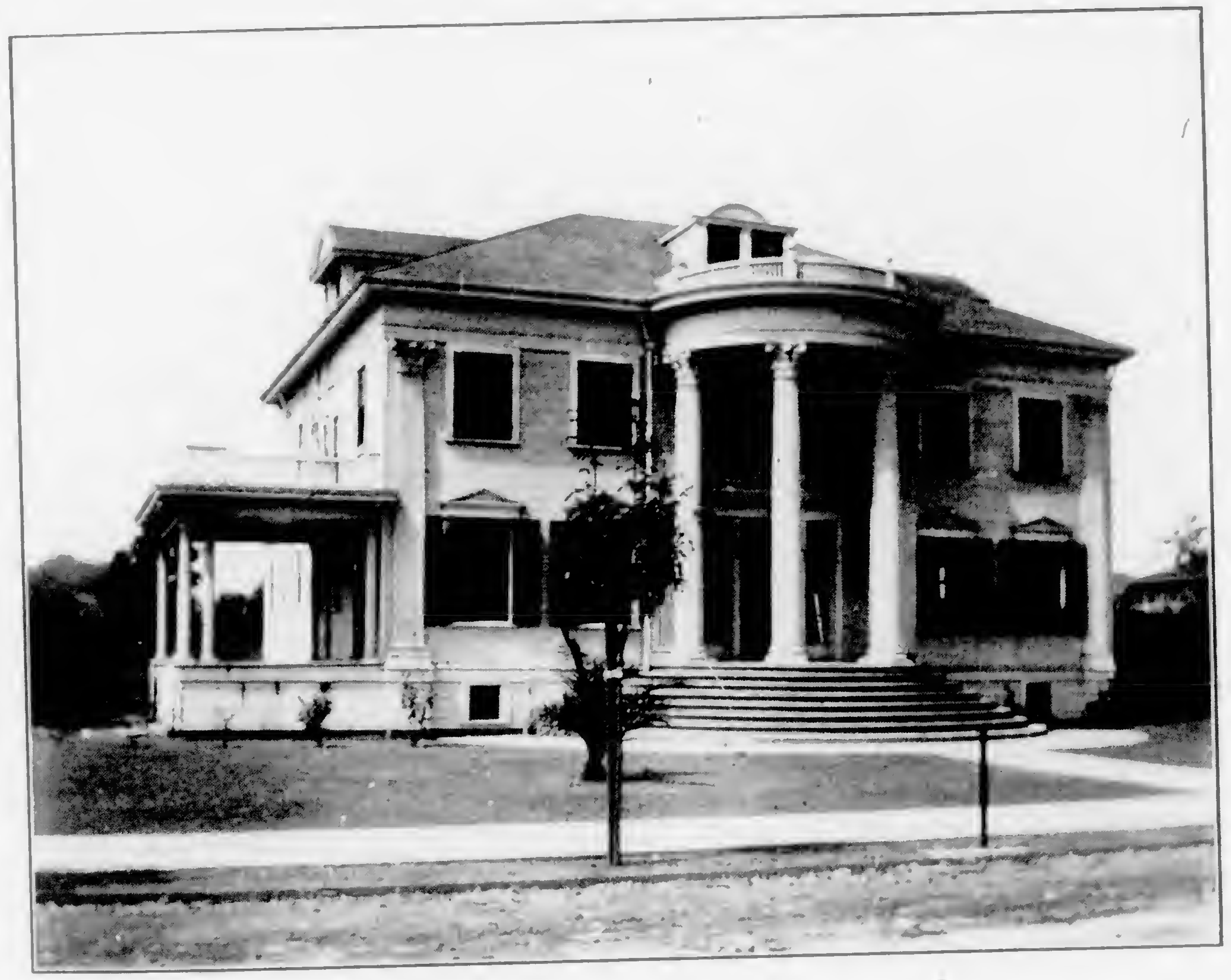
University Inn Stanford
Chas. F. Hodges Architect



A Professor's Residence Stanford
Chas. F. Hodges Architect



Residence of O. W. Dunn Stanford
Chas. F. Hodges Architect



Beta Psi Fraternity House, Stanford
Chas. F. Hodges Architect

Beta Theta Phi Fraternity House, Stanford
Chas. E. Hodges, Architect

Faculty Row was erected for the professors by Senator Stanford in the pioneer days of the University, and as I recall the same it bore a strong resemblance to the refugees' camps in San Francisco. Palo Alto was in its infancy, the depot a freight car, and when reached by a "long road which has no turning," barely furnished the necessities of life. Year by year the Fraternities sprang up in Palo Alto, and finally came over to the Campus, so that now there are only two left where the family tree started.

Residence of Lieutenant J. S. Oyster, Stanford
Chas. E. Hodges, Architect

Terra Cotta and Brick

Structural Terra Cotta as an Exterior Fire Wall

By GEORGE E. WALSH

THE great public value of a tall fireproof building in checking the spread of a fire is being more generally recognized today than ever before, and architects and construction companies are studying more intimately the technical problem of the exposure hazard. The use of structural terra cotta for the exterior finish of tall buildings has enabled architects to secure results in this direction which are worthy of special mention. The employment of terra cotta blocks for protecting the steel framework of the modern tall building requires no description, for the best architects and engineers consider this feature of the work as essential as the foundations and framework, but the use of structural terra cotta for exterior facings has more recently attracted attention.

The modern high office building or skyscraper must have an exterior coating of fireproof material to make it of avail in a great fire to check the onward rush of the flames. Moreover, this fireproof material must be securely anchored to the steel frame to prevent the building from shedding its masonry work during fires. It is the common opinion of engineers that had the San Francisco buildings been constructed of fireproof walls anchored to the steel framework, as commonly done in New York and Chicago, neither the earthquake nor the subsequent fire could have seriously damaged them. They would have acted as great fire barriers to give the fire-fighters a chance to have stopped the conflagration.

The construction of walls offers a more difficult problem the higher they go up. Each extra story increases the weight and taxes the carrying capacity of the steel work. An exterior coating of stone or granite fifteen or twenty stories above the street makes the problem of construction a matter of great technical skill. The great weight of the stone and the necessarily unwieldy size of the blocks makes construction work slow and difficult. Owing to these difficulties structural terra cotta has come into considerable general use in the past few years as a substitute for nearly all other materials.

Terra cotta, either for structural or ornamental purposes, is the lightest building material to be had, and it satisfies all the requirements of the modern office building. It is manufactured in convenient sizes and shapes, so that it can be quickly and easily handled. Time is a great factor in the construction of modern buildings. Any material that can be placed in position in less time than another without affecting the results must eventually prove more popular, for even days and hours count in putting up expensive buildings. Terra cotta for external and interior use can be put up at the rate of a story a day on some buildings, and the money saved by time alone is an important item in the final computation of cost.

A building covered with structural terra cotta is the most fireproof wall that can be placed in the path of a conflagration. It not only protects the building from outside flames, but it virtually saves other structures located to the windward. The light weight of the terra cotta enables the architect to fireproof the upper stories of his structure with comparative ease and inexpensively. In twenty and thirty story skyscrapers the terra cotta has become almost a necessity.

One of the most conspicuous illustrations of the employment of terra cotta for exterior walls is in the new West Street building, designed by Mr. Cass Gilbert. This is a twenty-seven-story structure and is being built on a plot of ground 100 by 200 feet. The entire front and side walls of the building will be constructed of terra cotta. The walls will be of buff terra cotta relieved by ornamental colored terra cotta. This extensive use of terra cotta in a tall building of this character indicates the developments in fireproofing exterior walls to protect them from outside fires.

From the architectural point of view, a building material must possess points of beauty and harmony of coloring, as well as such virtues as strength, durability, lightness and great fire resistance. In too many cases in the past fireproof qualities and durability have been sacrificed for the sake of artistic effects. In the effort to relieve our tall skyscrapers of their ugliness, a few years ago, architects resorted to elaborate ornamentation of stone and metal cornices, but there is a distinct reaction to this tendency to overornament in the best tall buildings of today. Simpler outlines are preferred, and most of the best skyscrapers in New York of recent years show a simple, screen-like treatment, in which monotony is avoided by terra cotta ornaments or plain terra cotta in different colors. This plain treatment in terra cotta, which tends to emphasize the strength and massiveness of the buildings is well illustrated in the new Wanamaker building, published in the Fireproof Magazine of recent date, and in the New York Times building and other similar structures. In the Times building the terra cotta ornament is conspicuous above the eleventh story, but below that the treatment is plain and flat.

The combination of the ornamental with the plain structural terra cotta gives to architects sufficient material to work out lines of beauty equal to that obtained in carved stone. This will be emphasized to an unusual degree in the new West Street building, which promises to be one of the most beautiful, as well as the most thorough, fireproof structures in New York. The terra cotta in buff for the exterior walls will be relieved from any monotony by the extensive employment of finely modeled and colored ornamental terra cotta.

The tendency to use terra cotta more extensively for exterior walls of tall structures is further emphasized in the new Plaza Hotel, which is rapidly going up on the site of the old structure, facing Central Park and Fifth avenue. The three fronts of this structure above the second story will be composed of enameled terra cotta brick and ornamental terra cotta almost marble-like in its finish. Upward of half a million terra cotta bricks will be used in the walls. When completed the structure will present on its three sides fireproof walls which would stop almost any fire sweeping across the city.

The use of terra cotta for exterior trim and ornamental purposes has been more popular than for general outside coating for fire-resisting purposes, but the value of structural terra cotta as a fire-retardent and its unusual lightness is rapidly securing for it a comparatively unique recognition as an essential part of every tall building. In the new Board of Education Hall at Fifty-ninth street and Park avenue the use of ornamental and structural terra cotta has been carried to a happy climax. The walls of the six upper stories are practically rendered fireproof from an outside conflagration by a combination of terra cotta bricks and ornamental terra cotta. No attempt has been made to overornament the upper stories, and the plain, flat treatment gives a perfect finish and a strong, durable effect.

The upper stories of the huge building at 42 Broadway show the effect of structural terra cotta when employed with the double purpose of securing effective details of ornament and a strong fireproof exterior. The six upper stories are finished in terra cotta, forming a fireproof veneer to the front, so that a hot fire could not warp or twist the steel work. The fireproof terra cotta veneer is bolted or anchored to the steel frame, so that there is no danger of the building shedding its coat. Even in the event of an earthquake shock it is doubtful if this terra cotta protection would be loosened from its anchorage.

The triumph of terra cotta for fireproofing is co-extensive with the development and success of the steel frame buildings. Without terra cotta the steel-cage buildings could never have reached their present stage of growth. There is no material light and fire-resisting enough to be used as a substitute for terra cotta for protecting the upper stories of high buildings. The load carried by the steel frame would become so great if reliance was to be had solely upon concrete or other building materials of this character that a building twenty or more stories high would have to be constructed of massive steel columns, girders and beams. The increase in the size and weight of the steel work would seriously involve the practical value and usefulness of really tall buildings.

The improvements in the manufacture of terra cotta blocks for interior fireproofing were made as the direct result of the demands of the day. Had not manufacturers of the hollow blocks brought their products up to the requirements of the builders a twenty and thirty story fireproof structure would be a novelty today instead of a common sight. Realizing the strides made in the manufacture of terra cotta for walls, floors and partitions to suit the needs of modern building conditions, the makers of exterior structural and ornamental terra cotta have within the past half dozen years exerted themselves to achieve like results. Perfect technical processes, and the adaptation of the material to architects' needs, have given a general impetus to the use of terra cotta for a wide class of buildings that were formerly built entirely of bricks and stones. Cheap artificial stones formerly composed the front walls of many of our commercial houses. Inferior terra cotta was also employed at first. But the architects, realizing the value of terra cotta, sought to give it direction and purpose, even before the manufacturers worked out their details of finish and manufacture. No attempt was made to imitate stone in the new designs of terra cotta, but the intrinsic merit of the terra cotta was brought out and emphasized. New colors were secured and new designs and technical methods of applying it to the exterior walls were adopted. The clumsy methods in vogue ten years ago have yielded to better and more economical methods, so that today it is not only the most serviceable and most fireproof building material for walls, but the most economical. When used in place of carved stone it produces equally durable and effective results, and is far more economical.

The blending of harmonious colors and texture of terra cotta for solid faces of walls has added greatly to the use of this building material. The tooling and molding of the surface blocks to produce striking effects have been developed to such an extent that more variety of designs can be given than with bricks. The adaptability of structural and ornamental terra cotta to different building conditions of the day is one of its chief features. For figure ornament and decorative treatment of massive wall surfaces it has no superior, and where the material is not used primarily as a fireproof coating it is often popular for the former.

The better architects are adopting terra cotta building material for their exterior walls more and more, and this is particularly true in the designing of skyscrapers and tall massive walls of commercial structures. The absolutely fireproof character of the material makes it of special importance in this age, when builders and architects are being called upon to construct buildings which will limit the spread of any conflagration. A dozen tall buildings with their exterior walls coated with terra cotta located in the business section of a city would offer more protection to the spread of a fire than half a dozen fire engines. They would prove effective fire barriers, across which the flames could not spread. Had San Francisco's business section been divided into districts by a few blocks of such structures the recent disastrous fire could never have reached its fearful climax.

The use of face-enameled terra cotta for both exterior and interior ornament is another feature of modern architectural development that is of value to one interested in fireproofing matters. The technical methods of manufacturing handsome fireproof, face-enameled terra cotta have greatly improved in recent years, and the result of this is that the architect can give wider scope to his expressions without introducing anything but fireproof material in his designs. Both the Hotel Gotham and the new Wanamaker building in New York have been largely finished off with dull enameled white terra cotta, and in the new College of the City of New York and the New Amsterdam Theater the enameled terra cotta is employed both for interior and exterior effect. The employment of durable colored glazed terra cotta has given new artistic effect to many of our public buildings, and the future of this form of terra cotta must be intimately interwoven with the character and development of our national architecture. Every improvement which tends to increase the fireproof character of our large buildings should be welcomed and the development of terra cotta in its different forms and composition is worthy of all consideration given to it by architects and builders. Even the ornaments of a tall building prove important factors in the situation when a hot fire is raging around it, for falling stones, metal cornices and other materials that are disintegrated and crumbled by fire frequently keep firemen from performing their duty properly. Fireproof ornaments that are anchored to the steel structure so that they become an integral part of the building are not so likely to be dislodged and made dangerous to fire-fighters when a conflagration attacks the outside walls.

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Of course you know a lot of bores, but you would no doubt be surprised to learn that there are people who consider you in the same class.

Cement and Concrete

Cement Block Architecture

By LOUIS H. GIBSON, Architect

IN A paper which I prepared for the convention of the National Association of Cement Users at Milwaukee I said: "I could never have hesitated long in accepting the cement block idea. I have hesitated long, however, in agreeing to accept cement blocks as at present manufactured. I have recognized the inherent merits of concrete construction and from the beginning have felt that making concrete in block form was a worthy building and commercial enterprise; but as one interested in architectural work the actual results of concrete block manufacture have been such that, until recently, I have felt that I could not afford to encourage and foster this industry. I do this now in this way, not because of any decided encouragement through specific results, but on account of what I recognize as a possibility. I know that a worthy cement block can be made commercially."

This statement was made because I recognized the merits of concrete as a building material and because it is desirable to fabricate concrete into block form. I knew that the block machine was a logical former of concrete for building material. I did say, at the Milwaukee convention, that I had never seen an artistically successful structure executed with cement blocks. In this number I am pleased to present a number of pictures of successful structures erected in block form. They are not the ordinary hollow block, turned out on a machine in the ordinary way, but that does not stand for any large material difference. Here are cement blocks, cast of concrete, made with a properly formed aggregate and a proper proportion of cement, properly finished and presenting wonderfully artistic results. Had I seen the pictures of these buildings before the Milwaukee convention, I should not have modified the general sense of my expression, but would have been pleased to illustrate what could be done with cement block. I was pleased to know that Mr. Charles D. Watson's paper followed mine, with illustrations by stereopticon. The cement block is an ideal form of building material, and cement stone can be made on a machine certainly as well and probably better on the average than it can be made monolithically within forms in the ordinary way, and certainly at much less expense.

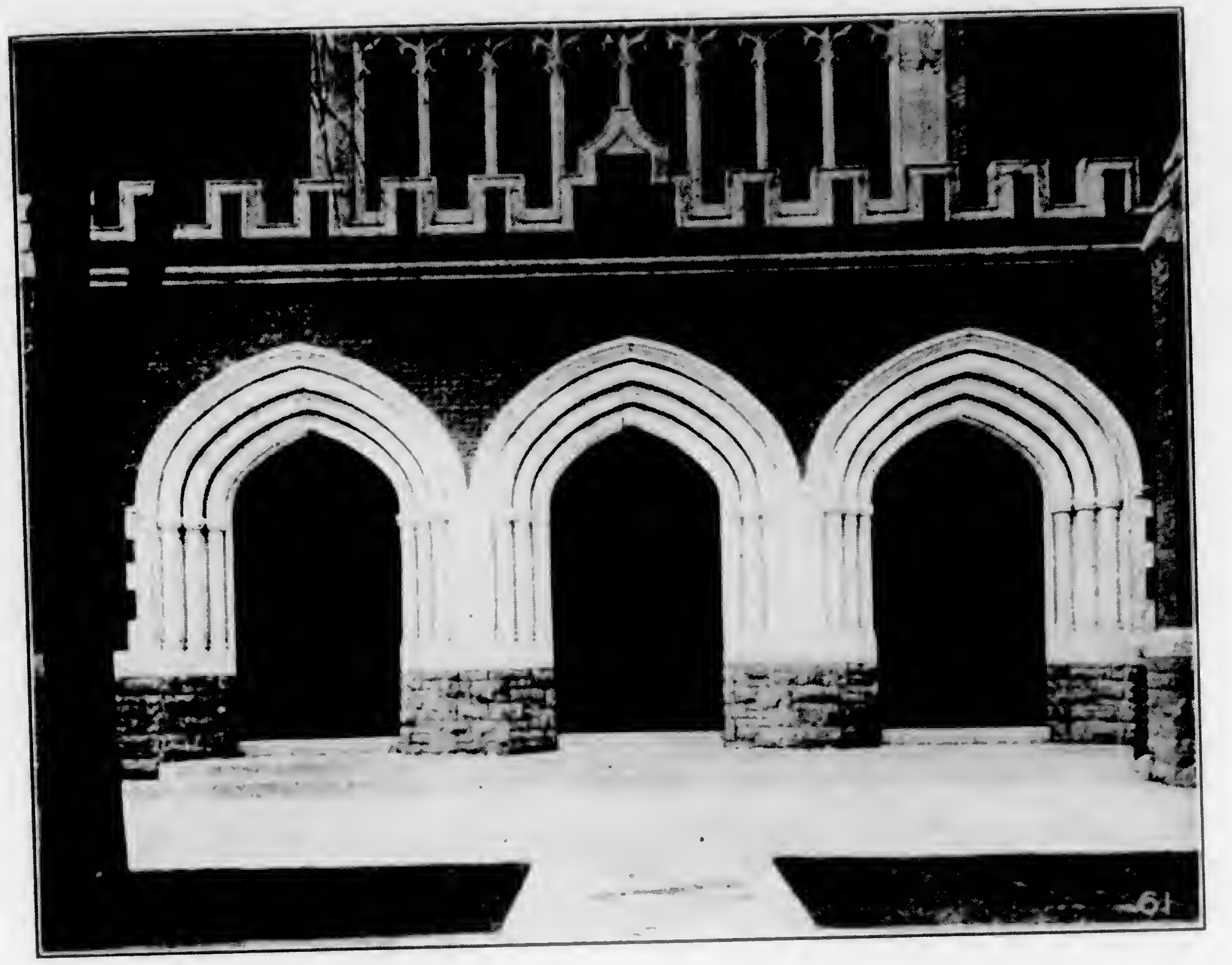
The pictures in connection with this article should serve as a stimulus and inspiration to every man who is in the cement block business. The building of the Canadian Bank of Commerce of London, Ont., is a splendid structure, splendidly conceived and wonderfully well executed. It is built of cement blocks. Every molding, every bit of decoration and the structural parts of this building, as we see them, are of concrete. Here is a splendid example of what may be done. It requires a quality of intent, a quality of mind and a high ideal to develop this kind of material result. Idealization is all right, so far as it goes. It is measurably valuable only in the expressed materialization. In the actual work it has to go from the heart of the artist, through the mind of the builder and the hands of the workman, and every step and detail of the process must carry along the same high quality of intent, sincerity and integrity. This may sound a little highflown to be expressed in connection with so prosaic a subject as an ordinary building operation, or to present to the ordinary, every-day worker, but it is the difference between the prosaic, common, low-down view and the view of the idealist that makes the difference between the ordinary ugly cement block work and the splendid expression which we see in these buildings. People are successful in business and commerce through their ability to render practical their best thoughts and bring them into material form to the people. A high ideal expressed in concrete is a cash asset. This has been done in connection with this work.

The building of the power house at Niagara Falls is a chaste, clean, dignified design, executed in a chaste, clean, dignified manner. The builder has absorbed the spirit of the architect and given it permanent and material form. After seeing this design as here executed, who will ever again question the possibilities of cement block? There need be no doubts or difficulties in the way. One need not say that these are cast stone, or that they are not made on a machine. Machine-made blocks are cast stone, and a high grade of blocks may be made on a machine. That these blocks were cast in sand or in any other way, by hand or by machine, cuts no figure. It is concrete, and the buildings are executed through the medium of blocks.

These pictures present an opportunity of estimating the commercial value of mere design. What is it that causes one bit of dress goods, one piece of furniture, one bit of tapestry, one house, to be far more valuable than another with the same amount of material in it and the same amount of labor expended in making it? It is the design which originated in the brain and heart of the artist. It was the artist who developed the great furniture factories of Grand Rapids. The manufacturer and workmen were but vehicles for the man with the pencil who made the designs for the products. It is the artist who gives value to the raw material.

The church details show a delicacy of conception and of mechanical execution which is not so clearly represented in the other pictures, though it exists in the others, nevertheless. This print shows the fine tracery in the windows, which is of concrete, and the delicate moldings in the doorways. On the other hand, if one were able to look at the larger photographs of the other designs it would be shown that there is the same quality of refinement and sensitive expression running through all of them.

Another valuable lesson in connection with this work comes through the rational consideration of the methods of construction employed. The work of building with cement blocks, stone, brick or terra cotta is essentially a block construction, and in principle there is no relative difference in the actual constructive employment of these materials. It consists of piling one block on another or one block against another,

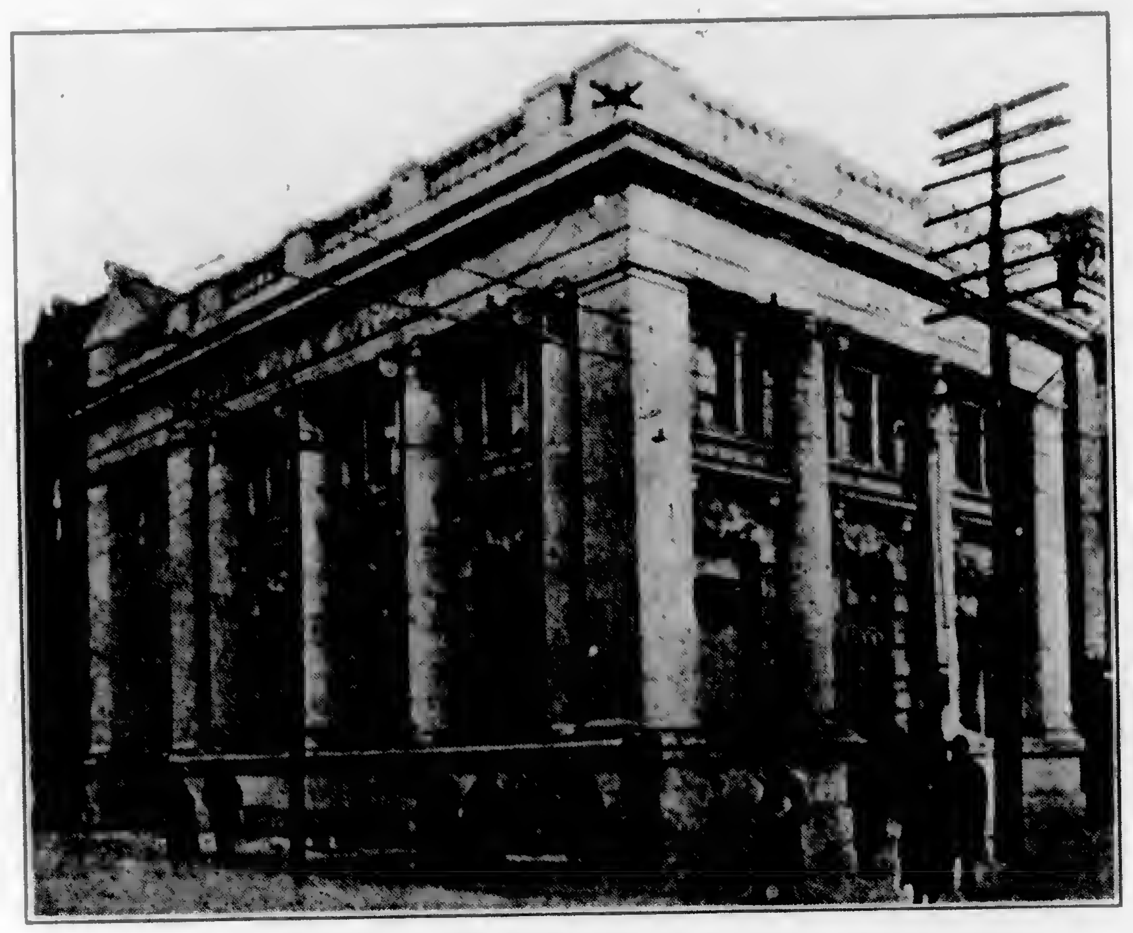


Central Methodist Church, Toronto. Artificial Stone Trimmings

and does not and should not assume to be a monolithic construction. It involves the recognition and exhibition of all joints and does not allow of their concealment. On general principles the system of construction by brick, stone, terra cotta and cement block is essentially the same. The pictures indicate that these designs are an honest expression of structural methods. The joints are a part of the design.

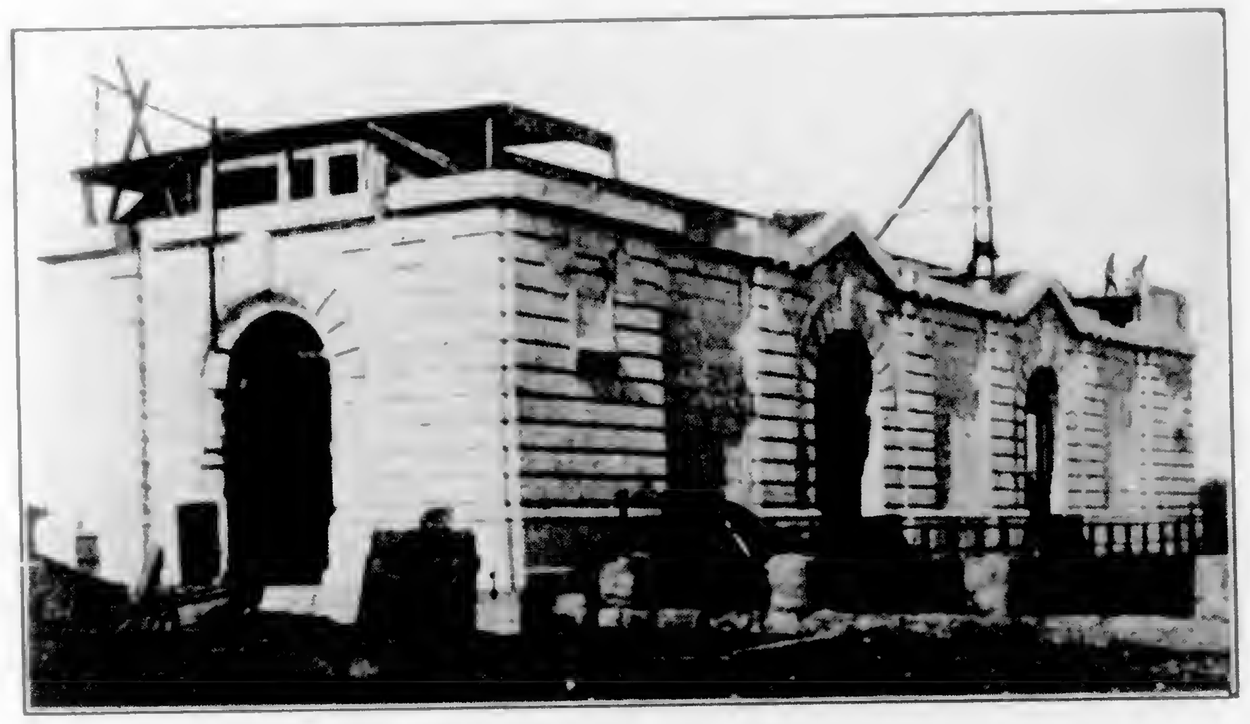
The structural forms which will naturally come out of reinforced concrete construction will be essentially different. Structural concrete methods, as expressed through the use of concrete and steel together, develop a monolithic structure—that is, a building which is practically in one piece. The design becomes a matter of external form and not an absolute expression of method used. Reinforced concrete buildings are built with a mixing machine, the wheelbarrow, the shovel, hoe, tamping tools and trowel, and their proper ornamentation will be developed through the use of molds or such forms as can be fashioned in and made a part of the structural work. Reinforced concrete construction is a casting or pouring process, and not a piling up or building up of block material. This affects the external form of the design, and, should one undertake to imitate block forms by monolithic methods, the result would be disastrous artistically. Try as we will, experiment as often as we please, and the result is all pronouncedly a failure if we consider other than an honest expression. Honesty is the best policy, surely, in art as in the commercial walks of life. Mr. Watson's work is successful because the methods employed are frankly indicated in the structural work.

Anyone who considers the work here pictured as seriously as it



Canadian Bank of Commerce, London, Ontario. Artificial Stone Block Construction

deserves and in its full significance must realize what this demonstration means to the concrete, the cement and the cement-block industry. Who is it that would hesitate in the use of concrete in block form of the character that is herein pictured, in competition with or in substitution for any other building material? Anyone would give it place, certainly, in preference to stone. It has a texture and structure certainly as good, possibly better and more determinable even than the oolitic limestone, than which there is no better natural stone for building purposes in the world. It is structurally fireproof, which stone is not. Certainly it would be esteemed more highly than terra cotta in its design quality. It is certainly more expressive, it has a sharper, cleaner appearance. It is structurally more stable. It certainly has a superior design value to brick. No intelligent or studious observer will hesitate in the selection of this material for any building, no matter what his ideas may be as to artistic or structural value. After seeing this work we need not feel



Gate House of Ontario Power Company. Artificial Stone Block Facing

that it is necessary to make any apology for cement blocks as a building material. We may apologize for or feel ashamed of the man who makes the common, ugly, lead-colored, badly conceived block which we see on every hand, but we may now realize that there is no excuse for his existence as a manufacturer. Any intelligent man can do this quality of work if he has the will to do. Work of the kind we have pictured is the expression, not only of artistic, but of commercial integrity. Manufacturers who enter into this cement block work in the same spirit will realize commercial results in dollars and cents.

One who travels and observes must have noticed that the people generally are especially anxious to use cement block and that they are more anxious to use them than are people to manufacture a high-grade block. One would imagine that there had been enough bad work done in the name of cement block to have killed the business. This is not true. It appears to go on apace as though a universally high grade of building material had been presented to the public. The architect in general practice has clients coming to him all the time who insist on using a common unworthy material of the every-day cement block maker. The architect almost has to fight to keep them from being used. With anything approaching the quality of Mr. Watson's work, there is not a self-respecting architect in the country who would be not only willing, but pleased, to use this material. He would know that he could express himself adequately and permanently.

The question of dressing blocks is destined to become a very simple matter. Pneumatically or electrically driven machinery would be readily devised for this purpose as soon as there is a demand for it and as soon as the material of a worthy character for building purposes is generally produced. By this means the cost would be reduced to a minimum. The time is not far distant when people will be willing to pay quite as much for cement block for building purposes as any other structural substance. It depends on the block maker.

* * *

Concrete from a Brick Man's Standpoint

By W. F. BARNES

WITH pleasure I read the article in your recent issue entitled "Terra Cotta and Brick" contributed by the "Clay Worker." This paper seems to have an unprejudiced way of looking at things; although devoted to the clay interests it does not abuse rival materials but concedes fairly that there are merits in all.

I think the men who will put money into new buildings should be treated honestly and not misled by fallacious arguments in the public papers. I do criticise the methods of some of the reinforced-concrete-building advocates. Their essential argument is this and nothing more —"some brick buildings failed in San Francisco; hence a reinforced concrete building will never fail."

Why has not someone already stated the facts of the case? Before the fire every building of importance in San Francisco, save one or two government buildings maybe, was constructed of brick or of brick and steel. Some of them had a facing of stone on the street side, as the St. Francis Hotel or the Kohl building, but they were all essentially brick and steel structures. The victory of these noble buildings over earthquake and fire has been the salvation of San Francisco and they are the pride of the city now.

In reply to this will the advocates of universal concrete buildings give us the names and descriptions of the reinforced concrete buildings in San Francisco that have survived the earthquake and fire? What is the truth of this matter? Were there really any buildings of this type in the city? Where were they, of how many stories, how large, what was the thickness of the walls, who was the architect and who was the builder? Can they not let us visit the buildings or give us photographs showing the "before" and "after"?

How do these people support their claims of the peculiar fitness of reinforced concrete for San Francisco when the material has never been put to the test of actual San Francisco conditions? Their claim is a theory; a great many other theories, plausible before the recent fire, have been discarded since.

The general condition of reinforced floors throughout the city does *not*, to my mind, support the contentions of the reinforced concrete men. I know some floors that have stood well; I know many others that exist as dust in the basements and still others that while maintaining an appearance of strength are really rotten through and through and must be torn down. This is true of concrete column protection in most cases; while it may have saved the steel it is utterly ruined by the fire itself. That is negative praise for a "fireproof" material.

Let us forget for the time all the newspaper talk of the last five months about concrete and, going back to the substance itself, inquire what its right to consideration as a fireproof material really is. For great engineering works, for subaqueous works, for foundations and in a certain class of buildings where there is little conflagration risk, it has incomparable advantages; but is it fireproof and does it not lose its valuable properties at a much lower temperature than would injure common, well-burned red brick?

And why should it not do this? Is Portland cement some new, irreducible mineral, or is it our familiar lime-rock and our familiar clay, crushed, pulverized, mixed and roasted sufficiently to expel the chemically retained water? Could not this roasting or burning proceed until from the lime-rock we have pure lime? Could not the same clay be burnt into an altogether different product? How then, in reason, can the mixing of these two half-burnt materials—either of which would be absolutely destroyed for the purpose in hand by a further application of heat—produce a fireproof material? I am absolutely convinced myself that the best concrete will disintegrate at a comparatively low temperature: I have witnessed the tests and better than that, I have studied the remains of concrete in burned San Francisco.

However, as I said in the beginning, I do not want to make a long article of this, because my purpose is too simple. What I do want is to see the public dealt with honestly in the discussions of this building material question. The business man of the city who is interested in building should be treated to a reason once in a while and not be fed entirely upon opinions.

* * *

People have time to stop and listen to the story of your success, but they are in an awful hurry when you attempt to explain why you failed.—Clay Worker.

Heating, Lighting and Electrical Work

An Improved Application of Hot Air Heating*

By A. O. JONES

AN improved warm-air heating system which has rendered modern furnace work less complicated—an ever increasing number of practical and perfectly working heating plans—make it possible to describe a thoroughly tested and practical heating system; a system insuring the greatest amount of heat from a given quantity of fuel, and one enabling the operator to control the supply of warm air, directing it at will into the rooms to be heated, securing ventilation at a small expense and reducing the cost of installing warm-air furnaces, at the same time increasing their efficiency, is, in the writer's estimation, and in the face of rapidly disappearing prejudices, a system worthy of universal adoption.

The system under consideration differs from those in common use in that ventilation is secured in all rooms and the basement is not filled with warm-air pipes, but consists of the placing of any modern warm-air furnace of the correct size in an ordinary basement of reasonable height. The furnace to be centrally located and supplied with fresh air of an amount equal to at least 90 per cent of the combined area of the basement pipes, and the warm-air chamber connected by one-half the number of warm-air pipes ordinarily used to improved warm-air registers placed in the wall of each room on the first floor, with a wall pipe continuing from the top of each register box to the rooms on the second floor, using for heating each two rooms—one on the first floor and one on the second—a basement pipe with capacity equal to the capacity of two pipes necessary for heating these two rooms separately. The manner of connecting the wall pipe to the top of the improved side wall register is shown in the illustration; also the method of pipe construction in the basement.

The advantages to be gained are that ventilation is secured in all the rooms, as these registers are provided with a double metal box, arranged with an air space between the inner and outer casing, and a ventilating opening, where air is drawn out of the rooms being heated and is conducted through the air space upwards, around the wall pipe—if single wall pipes are used—or through the space between the two casings of a double wall pipe when the latter are used.

The heat of the wall pipe causing an upward current insures a rapid movement of the foul air to a point in the attic directly above the registers, where it should be conducted through vent pipes to a chimney flue not used for any other purpose.

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*Read at the semi-annual meeting of the Heating and Ventilating Engineers on July 20th.

It will be seen that cellar air—as ordinarily used for protection when double wall pipes are used—is not allowed to enter the space between the two casings of the wall pipe, but, instead, air is drawn from the rooms; therefore, coal dust and fine ashes are not found escaping through the registers, as is sometimes the case with the systems that have been in use before the introduction of this system, which has been adopted by a great many furnace dealers who testify to the practicability of the system described.

The advantages of being able to utilize all of the warm air from the furnace in the first floor rooms when the second floor rooms are not in use should not be overlooked, for as is well known—with the old plan of installation—the closing of the second floor registers or the dampers in the pipes leading to the second floor registers, does not increase the amount of air delivered to the first floor rooms, but simply causes the air to be overheated, which is very objectionable—often giving rise to the argument which is advanced regarding vitiated air. While with this improved system the full amount of the air supply is constantly moving, and when the second floor rooms are not in use the fire in the furnace must necessarily be checked and a larger amount of air is supplied at a lower temperature.

When the second floor rooms are in use the increased velocity of the air in the perpendicular or wall pipes makes it possible to heat rooms on the first floor located some distance from the furnace, which is difficult without the assistance of the suction caused by the wall pipe.

The reduced number of warm-air pipes in the basement makes it possible to connect the larger warm-air conductor at a point on the bonnet of the casings where it can run straight to the register. This makes angles unnecessary, excepting in rare cases, and as a straight line is the shortest distance between two given points, the least possible amount of piping is used with very few angles; therefore, the friction and radiation is reduced to a minimum, which means cooler basements and warmer living rooms, to say nothing of the reduction of cost in installation.

The system, therefore, renders modern furnace work less complicated, insures perfectly working warm-air heating plants, securing the greatest possible amount of warm air from a given quantity of fuel, reduces the cost of installing furnaces, and makes failure almost impossible.

* * *

Vigilant Fido

In the barber shop the scissors clicked merrily away, and the barber's dog lay on the floor close beside the chair, looking up intently all the time at the occupant who was having his hair cut.

"Nice dog, that," said the customer.

"He is, sir," said the barber.

"He seems very fond of watching you cut hair."

"It ain't that, sir," explained the barber, smiling. "Sometimes I make a mistake and take a little piece off a customer's ear!"—Ladies' Home Journal.

Fads and Fallacies in Hot Air Heating

By R. S. THOMPSON

(Continued from the August Architect and Engineer.)

It is a fallacy to suppose that any old pipe of any old size put together in any old way will carry hot air. The force that carries hot air through a pipe is not sufficient to overcome any considerable resistance. Every care should be taken to reduce friction to the lowest point, to avoid eddies and prevent rebound from having the air strike a surface at right angles to its course. When the pipe is long greater size must be given to make up for the lower velocity. Two 45-degree angles are better than one 90 degree elbow, especially if put at a considerable distance apart. In the language of Gladstone, modified to fit the case, it is the province of the heating engineer to make it as easy as possible for the air to pass through the pipes and as difficult as possible for it to refuse to do so.

It is a fad for people in furnace-heated houses to open windows in order to get fresh air. People have an idea that air is not pure unless it is cold, and that unless they can feel a cold draft on the back of their necks they are not getting ventilation. I once overheard a lady remark in church:

"No, I don't think the church is too warm, but there is not a window open, and we shall die for want of air."

And I knew that at that very minute the furnaces were pumping in over three thousand cubic feet a minute of fresh air from out of doors.

These people remind me of the traveler, who, when stopping at a hotel, woke up nearly suffocated, but who slept sweetly till morning after he had broken a window—into a bookcase—in order to get fresh air.

A house heated by hot air needs no ventilation but what the furnace gives it. If the house is too warm, cut down the fire.

It is a fad to talk about furnace heat as a "dry heat." Heat not being a substance is never either wet or dry. Air when heated becomes "drier," that is, its capacity to absorb moisture is increased. But it is the heating of the air that makes it drier and not the method by which it is heated. It makes no difference in this respect whether the air is heated by contact with the iron in a furnace, or the iron in a radiator, or the iron of a stove.

If people want moist air make provision for moistening it, but I always wonder why the wise physicians who talk about the injury to the lungs from the "dry air of furnace-heated houses" send their patients with lung trouble to recover in "the pure, dry air of Colorado and Arizona."

It is a fallacy to suppose that if a furnace heats a house it is necessarily a good furnace, and if it does not it is necessarily a bad furnace. Given two furnaces which can each deliver at the casing top the same number of cubic feet of air per minute, at the same temperature, one may be a good furnace and the other a bad one, but one will heat a house as well as the other. They may differ in fuel consumption, in cleanliness, in ease of management, in durability, and in many other points, but in the ability to heat the house there will be no difference.

A furnace is a machine for the manufacture of hot air. That is all it is made to do and all it can do. The problem of manufacturing this hot air with the least expenditure of fuel, the problem of producing a machine for the manufacture of hot air which shall be cleanly, easy of management and durable are problems for the furnace manufacturer. But the problem of getting this hot air equally distributed through the various rooms of a house, and so properly heating the house, is a problem that rests solely with the heating and ventilating engineer. Given a furnace, good or bad, which can produce the requisite quantity of hot air at the requisite temperature and the proper heating of the house depends *wholly* on the hot-air pipes and ventilating arrangements.

The poorest furnace ever built, if large enough to furnish the requisite quantity of hot air, will heat any house if the engineering work is properly done.

The best furnace ever built will not heat two rooms if the engineering work has not been properly done.

It is the proposition of the man behind the gun.

This accounts for the fact that you will often find two men, using the same make of furnace, one of whom will declare it is the best in the world and the other is equally sure it is the worst. One is giving the furnace credit that belongs to the engineer; the other is placing on it blame which is due to the engineer.

It is a fallacy to suppose that leader pipes in the basement must have an inclination or "pitch" of one inch to the foot in order that the hot air may flow through them.

The ascensional force of hot air (if I may be allowed to coin a word) depends on the difference in elevation between the starting point and point of delivery. It will make no difference whether the air is carried six feet perpendicularly and twelve feet horizontally, or five feet perpendicularly and twelve feet at an inclination of one inch to the foot. What you gain in the pitch you lose in the riser. If I *had* to take my pipes off the side of the casing I would carry the casing up to within a few inches of the joists and carry the pipes horizontally under the joists. I would get the same total elevation by this plan as with a low casing and pipes inclined, but the elevation in the casing would be more efficient than in the pipes, because freer from friction.

But in practice I always use a flat-topped casing and take the pipes off the top, because in this way I can make straight lines from furnace to register boxes and foot-pieces, something it is rarely possible to do where you take pipes from the side of the casing.

By running the leader pipes horizontally and close to the joists you leave plenty of head room in the cellar, if it is of reasonable depth, and they who manage the furnace or use the cellar will rise up and call you blessed.

As in this statement I am flying in the face of all tradition and precedent, I feel that I must back my assertion with a practical example.

Last year in putting in a large job I was compelled, in order to reach a certain room, to carry the air through 88 feet of pipe. Sixty-nine feet of this pipe was horizontal and 19 feet perpendicular. The lay-out was as follows:

I started with a 22-inch pipe, which I carried five feet perpendicularly up from casing top. Then a 22-inch 90-degree elbow. Then five feet horizontally to the right. Then another 22-inch 90-degree elbow. Then 42 feet horizontally through a long hallway and out into a "Social Room." Here the 22-inch line ended and the pipe was capped. A few feet before the end I tapped this line with a 9-inch round pipe which heated two rooms in the second story and a 3½ by 12-inch pipe which heated one room on first floor. Close to the end of the 22-inch line I put in a 16-inch tee collar for a 16 by 20-inch register on first floor. In the cap on end of the 22-inch pipe I put a 9-inch collar; on this a 9-inch 90-degree elbow, with six feet of 9-inch pipe running horizontally to the left, where by a reducer and 8-inch round elbow I entered a perpendicular 8-inch round stack twelve feet high. This entered the bottom of an 8 by 10-inch square pipe, which ran sixteen feet to the right horizontally between the joints. The end of this pipe was closed, and I cut into the top a 3½ by 14-inch pipe with a 12x15-inch register just above the baseboard.

The long run of 22-inch pipe being all exposed was leveled with a spirit level. You will notice that in addition to the sixty-nine feet of absolutely horizontal pipe I had six 90-degree elbows, not counting the change in direction of air made as it came through the register.

You will notice also that the 16 by 20-inch first floor register was at the end of a 47-foot line of absolutely horizontal pipe.

In laying out this job I made the following calculations:

1. That the 5-foot rise from the top of the furnace would give sufficient force to carry the air to the end of the 22-inch horizontal line.

2. That as the capacity of the 22-inch line was considerably in excess of that of the three tappings, that the momentum of the air would, when it struck the closed end, drive a considerable amount around the 9-inch elbow, and through the 9-inch horizontal pipe, on the principle of the hydraulic ram.

3. That the 8-inch perpendicular pipe would take care of itself and give the air a good push to start it through the sixteen feet of 8 and 10-inch horizontal pipe.

4. That by giving this 8 by 10-inch horizontal pipe a capacity 60 per cent greater than that of the riser by which it was fed I would make up for the loss of velocity.

All the five registers on this system worked well, and equally well, and none better than the one at the end of 88 feet of pipe.

In my own justification I must say that I did not in this case send the air around Robin Hood's barn and back again simply to give it exercise, but because in this case the line followed was the most direct which the construction of the building permitted.

I could give plenty of other instances, and in fact every job I put in is an instance.

I freely admit that if by the use of "pitch" angles can be *materially* reduced or distances *materially* shortened there is an advantage, but claim it is due to reduction of angles and distance, and that this will rarely justify spoiling the head room in a basement.

But my time and your patience would fail should I attempt to give all the fads and fallacies which in my opinion have been connected with hot-air heating. The business has been far too largely left to unscientific men. Every man who has ever lived in a furnace-heated house thinks he knows all about heating with hot air. Every man who can handle a hammer and a pair of snips thinks he is competent to put in a furnace. The popular impression has been that science and skill were not needed, and if the house were not heated it was the fault of the furnace or the system.

* * *

How much common weal is sacrificed upon the altar of selfish individualism.

* * *

It is too often found more convenient to quote a maxim than to practice a principle.

* * *

Experience proves that those who gain money rapidly by speculation almost never keep it; and when they have lost it they are infinitely worse off than they were before -Success Magazine.

Greater San Francisco Construction Association

THE Greater San Francisco Construction Association, composed of prominent engineers, architects, contractors, material men and property owners, has organized permanently to counteract the labor troubles which seriously threaten to retard the reconstruction of San Francisco, and adopted the following resolution:

"That whereas, We believe the permanent reconstruction of our city is being seriously, if not fatally, retarded by continuous labor demands which have threatened to further force the labor cost in construction beyond fair and reasonable limits and surround the building industry with working conditions which tend to produce continual increasing industrial instability, and whereas, these conditions are largely maintained by restricted labor supply; and whereas, the city's greatest industrial need is a large amount of labor of a character that will replenish its depleted citizenship and give force to the work of rebuilding our ruins, be it

"Resolved, That this Association declares that it will exert every influence it possesses, and will co-operate with every other organization that displays a willingness to do so to invite, secure and guarantee permanent employment and protection with fair wages and hours to all competent labor that can by organized force be invited to come to this city."

The officers are: W. J. Wayte, President; Max Goldsmith, First Vice-president; W. W. Thurston, Second Vice-president; Richard Jones, Secretary; D. Franklin Oliver, Treasurer.

Relative to the sentiment that the building trades are demanding too high wages it may be said to the credit of the Associated Council of Carpenters that they have on two separate occasions voted down a proposition to increase the carpenters' minimum wage above $4.00 a day for eight hours. The demand for workmen, however, has brought the actual wages paid to $4.50 a day for first class men, and a few are receiving as high as $5.00 per day, the latter wage being paid to the best men and as a temporary bonus by contractors who have interior bank fixtures and other similar work to execute.

It is reported that there are hundreds of workmen engaged with non-union men under open-shop conditions, the unions, realizing that if they are unable to provide enough men they cannot, in fairness to the contractors, exclude others from employment. The union wages for bricklayers is $6.00 a day, but shortly after the fire in April wages went up to $7.00 a day. Plumbers have been granted an increase of $1.00 a day, making their wages now $6.00.

According to estimates made September 1st there were at that time 35,000 men employed in building operations in San Francisco as against 13,350 on January 1, 1906.

* * *

Propitious

An English daily had the following advertisement: "Wanted—A gentleman to undertake the sale of a patent medicine. The advertiser guarantees it will be profitable to the undertaker."—Christian Register.

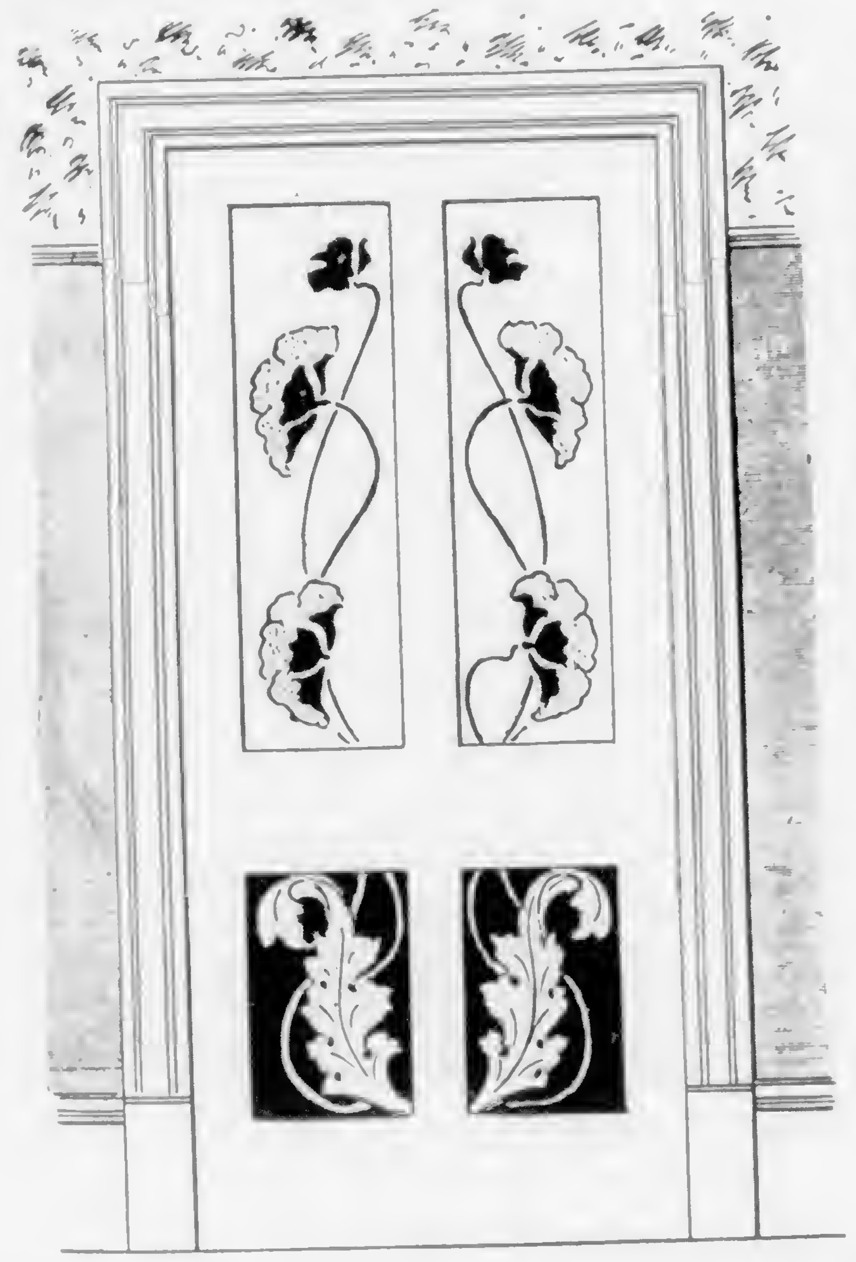
* * *

Some people seem to think that they can purchase friends just the same as they do groceries and drugs.

Novel Idea in Interior Decoration

By SIDNEY PHILLIPS

THERE is one part of the wall space of almost every room that is neglected by the decorator, and often cuts into an agreeable decorative scheme with a rectangular piece of bald panel work entirely out of harmony with the general effect. That is the door. Open or shut it obtrudes itself on the vision as a space filled with painted or varnished woodwork, deriving some little interest from the arrangement of the paneling—though in the case of the usual four panel door this interest must be very slight and relieved only by the slight shadows cast by shallow moldings, or perhaps by the grain of the wood, if it is finished in the natural. And if, as it frequently happens, there are several doors in the room, a large portion of the wall space is entirely uninteresting from the decorative standpoint. Some of the early Gothic doors were made attractive by the great wrought iron hinges, elaborately designed and exhibiting the cunning work of the smith, that served to bind the door together, as well as to hang it. Again, many front and vestibule doors are made with glazed upper panels, affording opportunity for bright colors and effective design. The value of these glazed doors as an attractive adjunct to a house has long been recognized by speculative builders. But there is no reason whatever why decorations upon doors should be confined to leaded glass.



The panels of the door afford an opportunity for decoration, either with stenciled, painted or burned-in designs, or combinations of one or more of these methods. And it may be well to add that whatever decorative scheme is employed for a door, should be confined, as a rule, to the panels, since the stiles and rails are the elements of strength which bind the panels together and support them, and hence should be free from decoration. If any ornament is to be used upon the framework it should be a simple geometrical treatment that would not take away from the structural character of the door. Besides the methods of decoration above suggested, there are, of course, others that are available, such as inlay, applied metal work or relief ornaments, or tapestry, or even wall paper can be used.

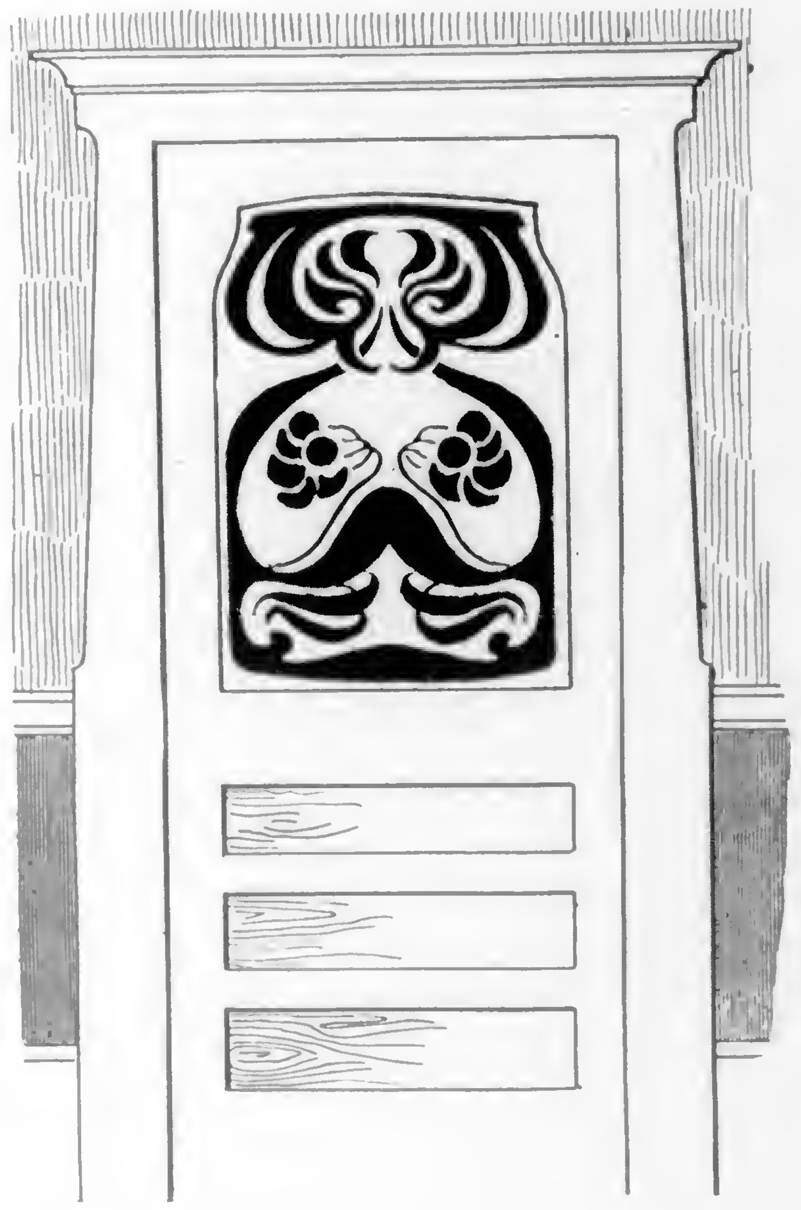
In the latter case, the hard prints, many of which are very beautiful, and the imitation leathers, some of which are close imitations of old Spanish tooled leather, would be very appropriate for a door panel decoration. The imitation leathers, such as are used for furniture coverings might also be used.

When fabrics or wall papers are used for decorating a door, the moldings should be first removed and the fabric stretched in position and tacked closely around the edges with small tacks, and the moldings should then be replaced, covering the rough edges.

In order to protect ordinary wall paper from being soiled by handling, it may be varnished after it has been pasted on the door panel. This is done by first sizing the paper with a glue size, prepared by boiling the best glue (gelatine in flakes) in sufficient water to make a size that can be applied smoothly and evenly, and after this has stood for at least twenty-four hours, applying a thin coat of white damar varnish. A second thin coat of varnish can be given if desired, but, as a rule, one coat will be sufficient.

Painted or stenciled decorations look well either on painted woodwork or on wood that is finished in the natural or is stained. In the latter case the decoration should be done after the work is filled and given a thin coat of shellac, which should be lightly rubbed with fine steel wool to bring it to a smooth even surface. In coloring the design, the effect of the varnish should be considered. An ordinary varnish gives a brown or yellow cast to the colors beneath it, changing blues to a greenish cast and considerably dulling the reds, greens and yellows. Where bright colors are desired to carry out the decorative scheme, care should be taken to use only such varnishes as are specially prepared for use with white enamel work. These are made from selected gum and are nearly colorless.

For pyrography or burnt wood effects which are particularly adapted to panel decoration, selected poplar or white wood is the best lumber to use, although straight grained oak (not quarter sawed) that is fine and uniform in grain, or cherry, may be used if desired. Maple is also well adapted for burning. In this case the burning should be done before the wood is filled.



For the purpose of illustration, two designs for decorated doors are given. In each case the Art Nouveau style has been used, since it is capable of so much variation and freedom of treatment. Of course, the Empire torch, the Colonial swag or garland, or the heavy laurel leaf festoon, as well as almost any decorative style can be employed.

The first door illustrated is an ordinary four-panel door, the design being a conventionalized poppy. On the bottom panels are large leaves with twisted stems that run on up to the upper panels, as though passing back of the lock rail, each supporting a large flower.

The leaves are of dull green, against a black or dark brown or blue ground. The flowers are bright red, or dull yellow against the natural color of the wood, the stems being green. The background of the lower panels may be darkened by burning.

But it is when the door is designed with a special view to decoration that the most novel effects and the best results can be obtained.

The second design is an odd one, the decoration being suited for painting rather than for burning. The color should be pale blue or green, or at any rate, should be light in tone. The flowers should be red or yellow. This design would look well in pink or pale green on a white or ivory enamel finish door.

The illustrations are intended merely to suggest some ideas of the possibility of painted decorations for doors. Many others should suggest themselves to the wide-awake decorator.—American Carpenter and Builder.

* * *

Wall Paper For Gloomy Rooms

WHEN choosing paper for the walls of bedrooms and sitting-rooms, it is well to remember there is another consideration than artistic design and harmonizing color.

A scientist tells us, says an exchange, that in these "nervy" days the color of one's surroundings is not a mere esthetic consideration. This is not as far-fetched as it may appear. When there is blue sky above, who is not happier and more cheerful than when mist and fog obscure the light of the sun? If we love the outside world beautiful, it is quite reasonable to make our homes so.

Here are some rules by which to go. The most restful wall paper is of one tint, without any pattern; this is good for nervous people. Have you ever, when ill in bed, reduced yourself to a state of nervous irritation by trying to join a big sunflower, or something, to its stalk which has wandered away in the pattern? Red is supposed to be rather bad for nerves, but is warm and cosy, especially if patternless. Dark browns and drabs depress sensitive folk, while a rich, clear brown is said to be quieting and soothing. Green is splendid for the eyes, and ought to be in writing-rooms and libraries. Clear, but not too vivid, yellow, we are told, produces exhilaration and self-confidence.

* * *

Portland Architectural Club

By C. H. KABLE

THE majority of the larger cities throughout our country support very active and influential clubs, the records of which show a constant gain in membership and professional standing. All have proved a great benefit to all members and to the community in general. It was a club of a similar nature which the five architects and draughtsmen had in view when they met to discuss the possibilities of an organization at a meeting last May. These five men were quite enthusiastic, and got others interested, so that, at its third meeting, held May 28, 1906, the following officers were elected to hold office for the ensuing year: E. B. MacNaughton, President; John G. Wilson, Vice-president; C. H. Kable, Secretary; H. A. Whitney, Treasurer.

During the organization of this club, all were interested in the work of other architectural clubs of similar nature, and especial interest was given the San Francisco Architectural Club on account of its nearness to us, also its good success since its organization a few years ago.

Among the Architects

State Board of Architecture

President	Henry A. Schulze
Secretary-Treasurer	Lionel Dean
Asst. Sec.-Treas.	Fred H. Roehrig

Northern District

Henry A. Schulze, Lionel Dean, Seth Babson, William Curlett, Clinton Day.

Southern District

John P. Krempel, Fred H. Roehrig, Octavius Morgan, Sumner P. Hunt, W. S. Hibbard.

San Francisco Chapter of American Institute of Architects

President	Henry A. Schulze
Sec.-Treas.	William Curlett
Vice-Pres.	William Mooser
Trustees	Jas. W. Reed and Clinton Day

Regular meetings, the second Friday in January, April, July and October.

Bank of Italy Building

Much interest has been manifested by San Francisco architects in the competition for plans for a modern fire-proof bank building for the Bank of Italy. Several of the leading architects in the city prepared sketches and some of the best plans ever brought out in a local competition was the result. The final selection was made by the bank directors from four names selected out of a dozen or more by a committee of three. The successful one was Architect Frank T. Shea, brother of City Architect Shea. Mr. Shea's plans, according to the bank officials, were elaborately executed, and were accompanied by estimates of actual cost which gave the bank people something tangible to work upon. The plans as accepted call for a ten-story building, having a granite base with a pink rose pressed brick front for six and one-half stories, the remaining three and one-half stories being of terra cotta. The floors will be of reinforced concrete as will the foundations. The windows and doors will have metal sash and frames. There will be two high speed passenger elevators and one freight elevator. The ground floor will be elaborately finished for banking purposes. The estimated cost of the building, which will occupy a commanding site at Clay and Montgomery streets, is $200,000.

The following architects and designers participated in the competition: Sutton & Weeks, Loring P. Rixford, William Curlett, Mooser & Milwain, Ralph W. Hart, Frank T. Shea, L. Mastropasqua, Italo Zanolini, John C. Pelton, C. R. Wilson, Charles Paff & Co., Stone & Smith and Gordon, Tracy & Swartout of New York.

Cuthbertson's Suggestions

Architect W. J. Cuthbertson of 1231 O'Farrell street, formerly city architect, has filed a communication with the Board of Supervisors setting forth his idea of how fires in the city might be checked. His suggestion is that the front space of all lots fronting on business streets shall be utilized for one-story fire proof structures to be devoted to business purposes, and upon the roofs of which shall be constructed sidewalks for foot passengers, the higher structures on the lots to rise back of these walks. In front of the fire proof structures on the street level he would cut narrower sidewalks, covered by arcades supporting street car tracks, one on each side of the street.

Gets Three Good Contracts

The Thompson-Starrett Company has taken the contract for the erection of an eight-story building on the southwest corner of Kearny street and Union Square avenue, for the Luning estate. The building will be class A and will cost $250,000. Nathaniel Blaisdell is the architect. The Thompson-Starrett Company has also been awarded the contract for reconstructing the Sherman & Clay building at Kearny and Sutter streets at an outlay of $175,000, and the erection of the Hotel Alexander on Geary street.

New Partnership

Charles Edward Hodges, the architect of various buildings at Palo Alto University, and Kenneth McDonald, Jr., recently from the office of Hunt & Hunt, in New York city, have become associated in business at 871 Eddy street.

Senator Perkins' Building

Plans for Senator George C. Perkins' new building on the southeasterly corner of Kearny and Bush streets have been completed by M. J. Lyon, the architect, and figures are now being taken on the handsome $100,000 structure which will be begun within thirty days. The building will be an exact duplicate of the former building, erected on the same ground, is designed by the same architect, and, as formerly, will be strictly Class A. The Senator has determined also to maintain its name, the Alto building. It will consist of eight stories and basement.

Bids for Claremont Hotel

Architect C. W. Dickey, with offices in the Macdonough building, Oakland, announces that he is ready to take bids for the heating, plumbing and electrical work in the new Claremont hotel at Berkeley. The building is now under way and is to cost $500,000. An elaborate heating and ventilating plant is to be installed as well as a private fire sprinkler system.

Will be Handsome Structure

One of the handsomest office buildings in the city will be the new Dana building, which will face Union square on the site of the old structure, the ground floor of which was occupied by the Peacock restaurant. Oliver & Foulkes are busy on the plans which call for a twelve-story building of steel, reinforced concrete and metal. The structure will cost $350,000 and the architects will be ready to receive bids in two or three weeks.

New Library Building

The trustees of the San Francisco Public Library, James D. Phelan, chairman, will shortly call for competitive plans for a library building to cost upwards of $1,000,000. It is planned to make the structure one of the most beautiful and imposing public buildings in San Francisco. Andrew Carnegie has donated $750,000 towards the new structure.

Odd Fellows' Building

Oakland is to be the home of the state officers of the Odd Fellows' lodge of California and plans have just been finished by Architect Samuel B. Zimmer of the Bacon Block, Oakland, for a $250,000 building of handsome French renaissance design. The structure will be nine stories high and will be constructed of concrete, stone and terra cotta. The committee has under consideration some added details to the plans, including marble pillars to extend from the first to the third floors.. This would entail an extra expense of about $30,000.

The building company is capitalized for $100,000. The company has purchased the northeast corner of Nineteenth and Grove streets, the lot being 90x131 feet. The directors of the company are Jesse A. Jackson, president of the Phoenix Planing Mills; George W. Schmidt, B. F. Edwards, Thomas Gilbert, John E. Henderson, F. J. Wentworth, W. F. Woods.

Brick and Terra Cotta

Granite, gray brick and terra cotta will be used in the exterior construction of a ten-story brick building to be erected by the International Savings Bank in Los Angeles from plans by Architect H. Alban Reeves. The plans call for footings and cantilevers of reinforced concrete to support a riveted steel frame. Contracts for the brick and stone work will be let in a few days. The building will have a basement and sub-basement and will occupy the corner at Spring, Temple and New High streets.

Reinforced Brick for Whittell Building

Architect Frank Shea is at work on plans for a $250,000 hotel to be called the Langham. It will be eight stories and one of the finest equipped hostelries on the coast.

It has been decided to use brick instead of metal sheets on the Whittell building, the steel frame of which is finished. The brick will be wired so that it will stay in position in case of a severe shock or strain. Work on this skyscraper is to be rushed without further delay.

Los Angeles Architectural Club

The Los Angeles Architectural Club has been recently organized and at a meeting held in rooms on the second floor of the Tajo building, which the club will now occupy permanently, officers were elected as follows: President, H. F. Whitney; Vice-president, E. R. Jeffery; Secretary, A. R. Walker; Treasurer, P. J. Van Tress; Chairman of the House Committee, Walter Erkes; Chairman of the Library Committee, Albert Crowder; Chairman of the Auditing Committee, George H. Brown.

Buys Lot for Hotel

J. A. Marshall has just purchased the Seneca Gale property on the corner of Bancroft and Telegraph avenues, Berkeley, for $17,500, on which he will erect a four-story hostelry. C. M. Cook of Oakland is the architect. The building will contain 150 rooms.

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ARCHITECTS MUST HAVE LICENSE

The State Board of Architecture is doing the right thing in bringing to task practicing members of the profession who have neglected or failed to secure the necessary State license. It has been known to the Board for some time that a large number of Easterners were practicing in San Francisco without the required permit, but it has been an extremely difficult task to secure evidence against the offenders that would insure conviction in court. Some who would evade prosecution have been practicing as "architectural draftsmen" or "architectural engineers." The penalty for practicing as an architect in this State without a license is $500 fine and one year's imprisonment, and the court can inflict both. Registered architects are glad to see the move of the State Board, as it is no more than right that those who pay into the State coffers a license fee should be protected while the fellow who would evade payment should have meted out to him the full penalty of the law.

* * *

DEPARTMENT OF ARCHITECTURE

Today on this Coast the demand for competent architectural assistance has never been equaled. Architects are seeking those who are properly qualified, and the increased remuneration offered has led many young men to inquire how they may prepare to advance in this field of work.

But few persons comparatively, outside of the students themselves, are aware of the advantages offered by the Department of Architecture of the University of California at Berkeley, and a word of explanation may not be amiss.

The Architectural building is located in one of those pleasant wooded spots in the University grounds overlooking the Golden Gate, and here a little group of earnest workers is taking its first steps in this great avenue of human endeavor, in the spirit, as well as in the letter—in all that the word "architecture" means—in charge of one eminently fitted for the position, both by nature, education and experience, aided by thoroughly competent assistants. Here are being formed ideals and conceptions which will be visibly impressed upon the greater San Francisco of tomorrow.

Space will not permit of a detailed description of the courses of instruction given, which include theory and history of architecture, architectural design, water color, modeling, pen and ink rendering, graphostatics, stereotomy, freehand drawing, perspective, etc.

The State has liberally supplied, and private generosity has assisted in providing, these advantages for all those prepared to receive them. Special students are permitted, under the regulations of the University, who show conscientious efforts to advance in these branches, and the writer will vouch for the fact that no ambitious aspirant will regret the time he may devote here. The days are far too short, and many a late passer-by sees the lights still burning, while with unabated enthusiasm this little band works on in the night.

Probably the finest library of architecture in the State is at the command of each student, who is encouraged to take deep draughts at the fountain which metaphorically is filled to overflowing with treasures of the rarest architectural value.

The problems given the advanced classes are in line with those of the Ecole des Beaux-Arts, at Paris.

A society of architectural students of the University has been formed, and it is the intention to hold an exhibition in December to be participated in by all students and graduates, when an opportunity will be given to all who desire to observe the high standard of work required by the University.

WILLIAM A. NEWMAN.

WHAT CONSTITUTES A FIRE-PROOF BUILDING

We hear much nowadays as to what really constitutes a strictly fire-proof building. A great deal has been written in favor of this and that material but we have failed to observe any article that has presented a practical instance of the complete effectiveness of perfect fire proofing. The building that has been destroyed has always been a building with something lacking to make it immune from fire. How are we going to know when we get a perfect fire-proof structure? It will take a mighty warm fire to give it the proper test.

While in some particulars we do not agree with F. W. Fitzpatrick, the Washington architect who writes quite logically on fire-proofing—Mr. Fitzpatrick is not a reinforced concrete enthusiast—he believes in its use only in a modified form—still we think he has gotten together some excellent ideas of what a perfect fire-proof building should be and the substance of his conclusions are reprinted herewith. He admits that even in San Francisco there have been features enough about the several structures that, if assembled in one building would have made that an ideal building.

"Let the foundation," says Mr. Fitzpatrick, "be sufficient in extent and on good bottom, or carried down to good bottom by concrete piers or reinforced concrete piles. Build a framework of steel; let the factor of safety be a most liberal one. Don't try to save rivets; use gusset plates at connections; wind-brace your frame thoroughly; tie it laterally, and where possible, cross-tie your verticals. Paint your steel if you wish, but certainly be sure and cover it all, bed it thoroughly in cement. Then protect it in every part.

"Fill in the voids of your columns with brick or concrete or tile and incase the whole in four-inch blocks or fire-proof tile, the parts of which are at least one inch thick. Bond this tile together and tie it into the column and to the frame; make it a homogeneous mass; do the work as were fire-proofed the Chicago post-office columns and no earthquake nor fire will ever affect your vertical supports.

"Make your floor construction of narrow span and rigidly tie your frame; stiff angles are preferable to tie-rods and floor spans of seven feet and eight feet between twenty-foot long beams, without tie-rods or brace, in an earthquake region, should never again be used. Fill your floor spans with deep, flat arches of porous tile, the deeper the better; or, if great weight is no disadvantage, then use deep arches of concrete, but let there be a tile protecting ceiling surface to the latter, or well below the arches a suspended ceiling of metal lath and plaster. In every case have the soffits and projecting members of your floor frame covered with fire-proof tile of two thicknesses.

"Build your outer walls from story to story of brick or concrete, but face it internally with hollow brick and externally with a good quality of well-burned brick. Where ornament is desired use well made terra cotta. Don't be afraid of the *quantity* of the material; it is only the thin, sharp angles and uneven, poorly baked surfaces that scabble off in a fire. With an even thickness in ornament and plain, plenty of ribs, and properly burned, terra cotta will stand any fire you expose it to. The use of granite, stone and marble, wherever fire can get at them, will hardly be looked upon with much favor by San Franciscans. Use good cement mortar in your walls. Tie them and bond them thoroughly and make them close kin to the frame, not mere distant relatives. Don't be afraid of using plenty of steel in your terra cotta cornices, tie them in, anchor them and make them part of your building, not merely an easily dislodged, removable lid.

"Use wire glass and metal or asbestos frame wherever your windows expose your building to external fire—and remember that in San Francisco buildings ignited that were a hundred feet from the source of fire. Where there is much danger from narrow alleys and adjacent buildings use *double* wire glass; don't put a wooden roof on an otherwise good building; make that roof as invulnerable as any floor. And if there are taller buildings than yours alongside of you, make it stiff and strong enough to withstand the shock of falling walls. Build your partitions of at least four-inch hollow porous tile, not on top of a finished wood floor nor on the concrete filling and wood strips, as was done in San Francisco and alas, so many other places, but on the solid bearing of steel and floor construction.

"Use good mortar with your tile; bond and lap the surface with metal fabric and clinch it with a good wall plaster. Don't, in Heaven's name, insert wood jambs and lintels for the finish; use metal members. The efficacy of metal trim has been amply demonstrated there and elsewhere. What is the use of filling your building with tinder? Metal or asbestos cement doors and trim are not prohibitive in cost, they are cheap at any price, and their advantages are manifold. Cut up the interior of the building into units that make a fire in their contents easy to handle and confined to small space. Make each story a unit by absolutely closing off elevator and stair wells, accessible only through self-closing fire-proof doors in either solid partitions or wire glass inclosures. Carry out the idea of small units by making, in an office building, each office independent by means of wire glass in the corridor divisions. Provide tanks or other sources of local water supply that will be of incalculable benefit to you or your neighbors in case of accident to the municipal supply. Accustom your employes to using judgment, coolness and skill in dealing with an incipient blaze that may occur in any one room or in fighting fires in adjacent buildings."

The Publisher's Corner

Unloading a Lumber Schooner at Oakland

The illustration shows one of the big lumber schooners which ply between San Francisco and the Washington coast, unloading at the great wharf of the Sunset Lumber Company in Oakland. This company has one of the most extensive lumber yards on the coast and its superior water front facilities enable it to keep the yard well stocked with redwood and pine, although the demand for lumber since the earthquake has exceeded all previous records.

Three boats are unloaded every week at the Sunset Company's wharf alone, which gives one some idea of the vast quantities of timber used in new construction work in the cities across the bay.

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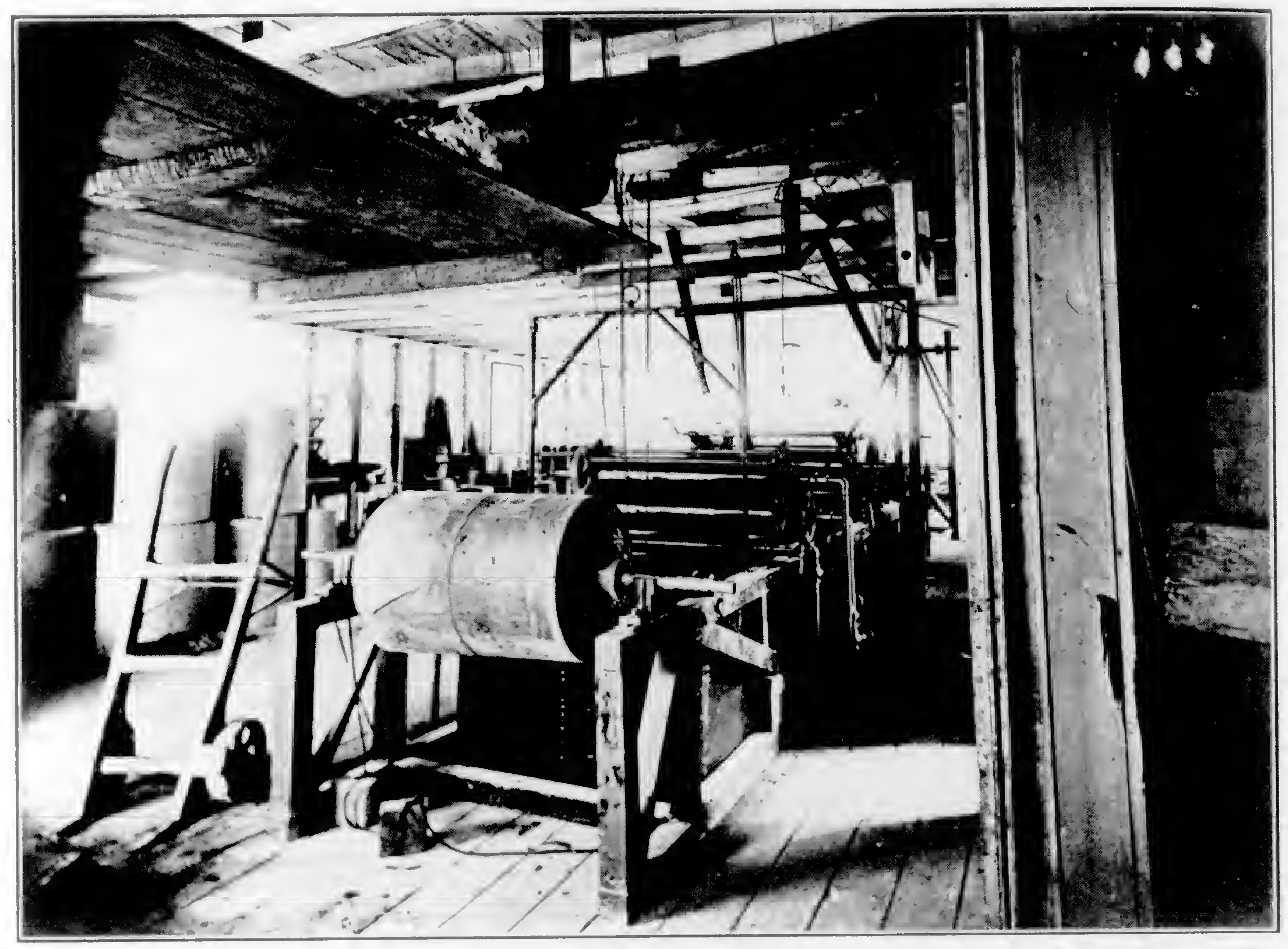

One of the Flexo Machines

Lead Grinding Room

Flexo A Fire-Proof Roofing Paper

The Flexo Building Paper Company succeeds the Continental Paint and Varnish Company of 918 to 924 East Twelfth street, Oakland, and has moved into its new offices which have been handsomely fitted up. W. J. Piatt, well known as the President of the Bayside Manufacturing Company, is President of the new enterprise which should be sufficient guarantee for the success of the Flexo Company. Mr. Piatt has made the Bayside Company one of the strongest enterprises of the kind on the coast and the secret of his success is enterprise. Mr. Piatt never lets the grass grow beneath his feet: He works early and late and employs a staff of assistants who are known by the trade as hustlers. Although the Bayside Company is little more than a year old it has a run of ten mills of grinding lead, oil colors and mixed paints, which means the second largest plant of the kind on the coast. Business has trebled since the earthquake and in a few days the stockholders are to receive a surprise in the shape of a handsome dividend. The Flexo Building Paper Company will be given the same attention that brought success for the Bayside Company. J. W. Zollars, Vice-president, has been East, where he purchased machinery and a large stock of goods to complete the company's plant. Flexo building paper is for roofs and among its commendable qualities is extreme durability, as the name implies. It is said to be one of the best fire-proof roofs yet placed on the market. Fires can be built on any roof covered with Flexo Building paper without the slightest danger of burning any part of the covering. The company has machines for turning out its own patent processes so that it may be truthfully called "home industry," no part of the paper being made outside the State.

New Hardwall Plaster Company

The Pacific-Plymouth Plaster Company is a new San Francisco enterprise, organized since the fire. The company has the exclusive handling of the famous Plymouth Rock hard-wall plaster. Its office and salesroom are at 1083 Howard street, near the postoffice. The following announcement is made by the company: "To the Trade—We are carrying a full stock of hard-wall cement plaster, stucco, plaster paris, wood fibre plaster, together with especially prepared goods for expanded metal, wire, lath, brick and stone work, and will have constantly on hand the highest grade goods in these lines ever placed on this market—and the price is right, too.

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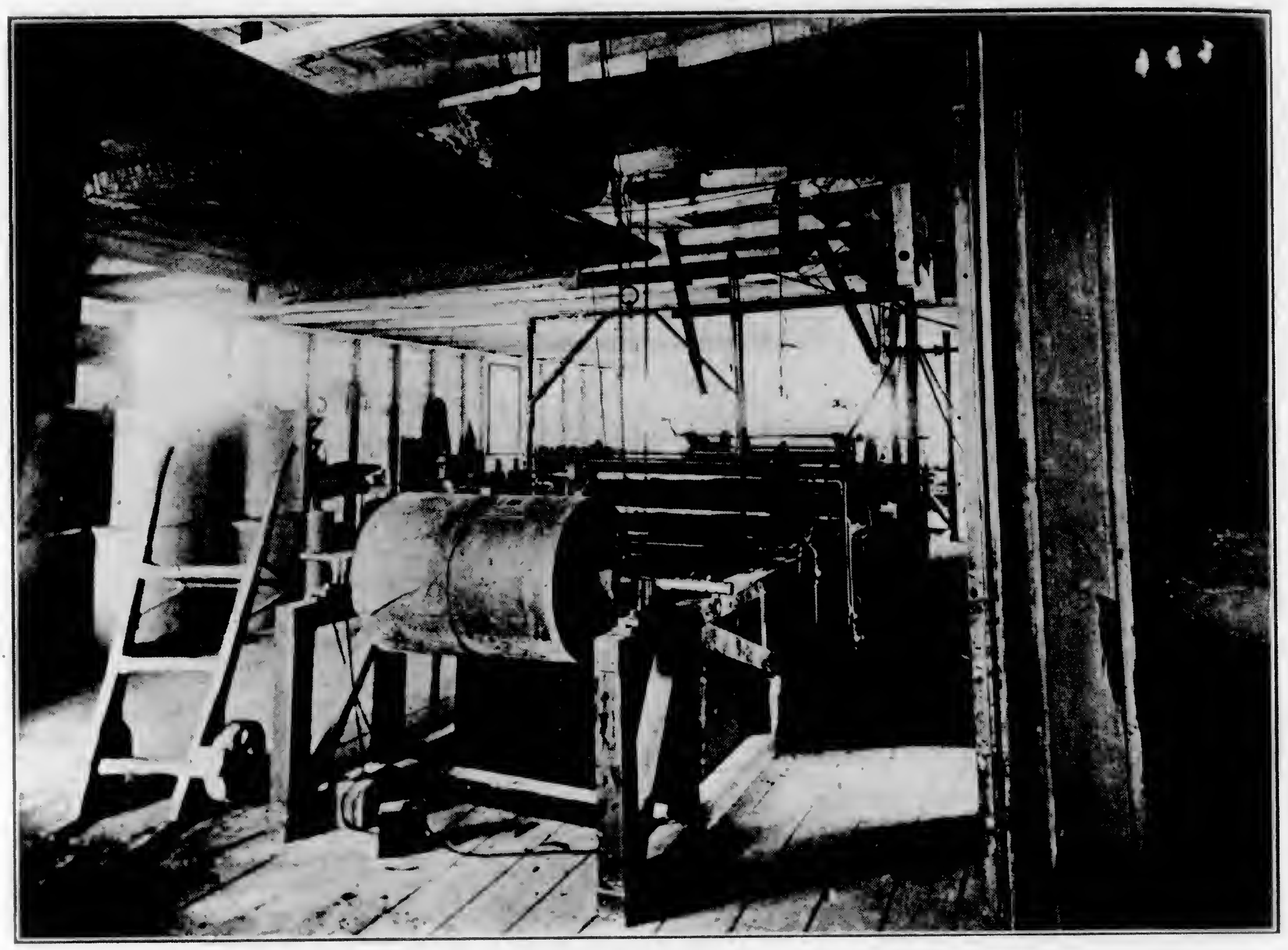

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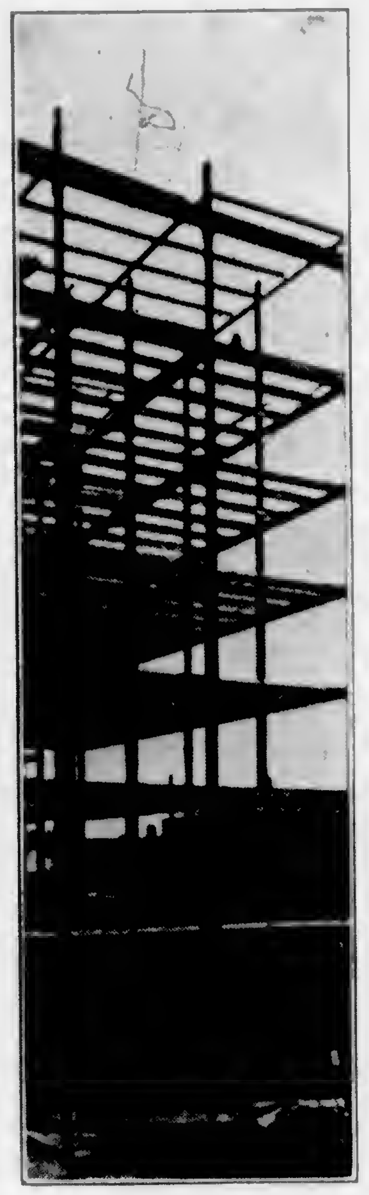
"We challenge comparison of our goods with any other hard-wall plaster on this market, with the full assurance that there is **none** that is equal to it in quality.

"This is a California enterprise run by San Francisco men, and we trust that



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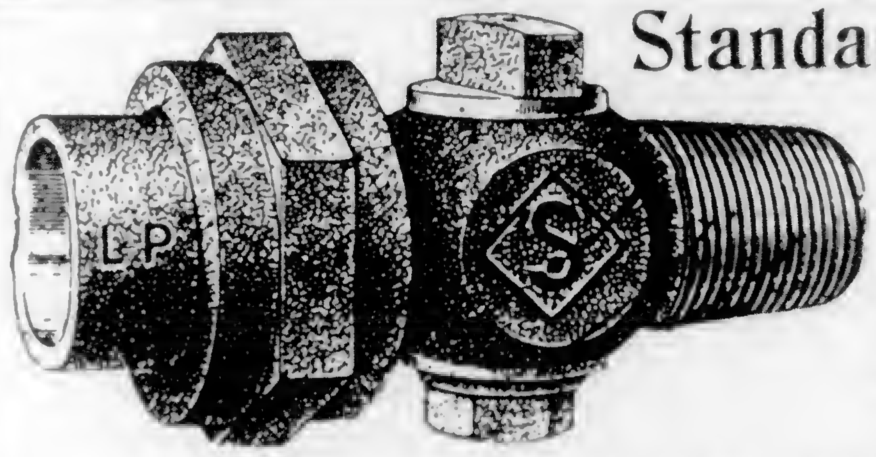

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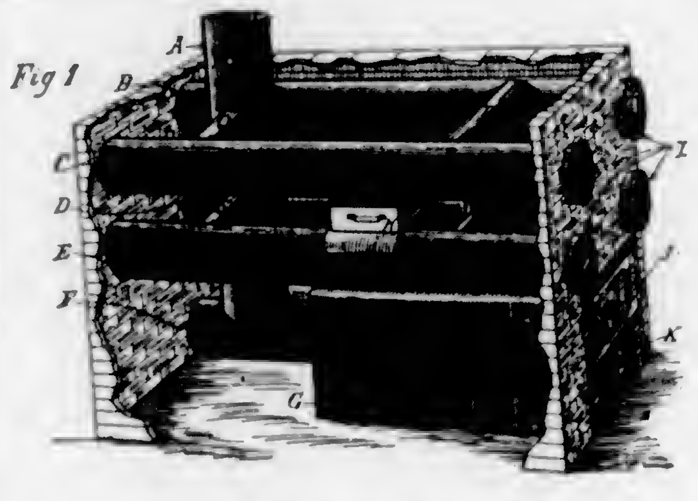

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and do not harden or blow out under the most severe conditions. The H. W. Johns-Manville Co., New York, will shortly issue an attractive catalogue showing their complete line of "J.-M." Asbestos Packings and we understand that copies of this will be mailed free upon request. The Pacific Coast office of the Johns-Manville Company is at 180 Second street, San Francisco.

Cement on the Way

Mr. A. Breslauer, the well-known importer and dealer in cement, has taken permanent offices at 212-214 California street, San Francisco. For the present he will also retain his office in the Builders' Exchange in Oakland. He has the control of some very large consignments of high-grade cement here and it is due to arrive in a short time.

Big Onyx Shipment

The steamer St. Denis recently arrived in San Diego from the lower coast with more than 200 tons of onyx, one of the largest shipments ever brought in. Part will be sent to eastern factories, while the remainder will be used by the new Pedrara Mexican Onyx Company for the trade in San Francisco and vicinity. Lew C. Black, Bacon block, Oakland, is the local representative.

The Pacific Coast Cement Company, J. J. Abramson, sales manager, 430 Chamber of Commerce building, Los Angeles, with mills at Ambay, Cal., have secured the order for all the plastering for the new Fairmont Hotel. of 1000 rooms which is about to be constructed here. "Holdtite" cement plaster has a well deserved reputation, and the results in a building of this magnitude is a foregone conclusion.

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Contents for October

PAGE

Frontispiece — John B. Leonard, C. E. - - - - - - - - - - 18
Reinforcing Concrete - - - - - - - *John B. Leonard, C. E.* 19
Architects Must Do Better - - - - - - - - - *F. W. Fitzpatrick* 23
Shelter First — Then Permanency - - - - - - *Theodore Starrett* 28
Wanted — Fire Insurance - - - - - - - - - - - - - - 29
Advise Steel Frame and Reinforced Concrete for State Buildings - - - - *Official Report of John Galen Howard, John D. Galloway* - - *and Reid Bros. to State Lunacy Commission* - - 30
For the New San Francisco - - - - - - - - - - - - - A Series of Architects' Drawings of Projected Buildings 35
Fire Remedies Suggested by Expert - - - - - - - - - - - 42
To Restore Mission San Luis Rey - - - - - - - - - - - - 44
The Education of the Public in Architecture - - *John Belcher, A. R. A.* 45
American Architecture as Viewed by an English Architect, *A. C. Hope, Architect* 51
Terra Cotta and Brick — New Uses for Terra Cotta Building Blocks - - 53
The Hotel Blenheim — A New Type of Construction - - - - - - 59
Cement and Concrete — Concrete Finish — Veneer Anchorage - - - - - - - - - - - - *William B. Gester, C. E.* 61
The Concrete Block Industry of the Future as Indicated by the Past, *A. P. Melton* 62
Heating, Lighting and Electrical Work — The Adaptability of Various Art Classifications to Lighting Fixture Designing - *Carl E. Roesch* 65
The Paint and Painting Question - - - - - - - - - *H. T. James* 67
San Francisco Architectural Club Celebrates Anniversary - - - - - - - 68
Do Fashions Follow Architectural Whims? - - - - - - - - - 69
Interior Decoration — New Style Mission Wall Papers - - - - - 70
Floral Upper Thirds - - - - - - - - - - - - - - 72
Landscape Architecture — Landscape Gardening in California - - - - 74
The Architectural Draughtsman with School Training - - - - - - - - 76
Among the Architects — 78
Editorial — 82
Publisher's Corner — 92

JOHN B. LEONARD, C. E.

THE
Architect and Engineer
Of California

Vol. VI. OCTOBER, 1906. No. 3.

PROBABLY no subject carries greater interest with the architect and owner today than the question of the actual amount of steel needed to properly reinforce concrete. The problems involved are possibly as warmly debated and as little understood as any now confronting the building profession. To economize space, provide as shallow beams as possible where ceilings must be unbroken because of movable partitions, to get all the stories wanted under the limit of height without weakening the frame, and to keep the increased tonnage of steel demanded by these conditions down to the least amount consistent with a proper factor of safety—these are some of the more important points touched in the following article prepared especially for Architect and Engineer readers by the coast's foremost authority on reinforced concrete construction. Mr. Leonard needs no further introduction.

Reinforcing Concrete

By JOHN B. LEONARD, C. E.

THE proportioning of steel in reinforced concrete construction is a problem that presents many varied and, sometimes, apparently, conflicting conditions. A little patience, however, convinces one that the law as enumerated in proper formulae is true and inflexible within its limitations, chief of which is the elastic limit of the steel. This occurs because in deducing the formulae, there has been assumed a ratio of the modulus of elasticity of the steel to that of the concrete.

It is a well known fact that when steel has been strained beyond its elastic limit, its modulus of elasticity instead of being 29,000,000 will have dropped probably 75 per cent. To calculate the strength of the beam under this condition, a new hypothesis must be assumed.

In order to keep the working strength of the structure within known limits, such amount of steel must be used that it will not have passed its elastic limit at or slightly less than the desired ultimate strength of the

JOHN B. LEONARD. C. E.

1-19

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In order to keep the working strength of the structure within known limits, such amount of steel must be used that it will not have passed its elastic limit at or slightly less than the desired ultimate strength of the members. The unit stress for the working load should be selected with reference to the elastic limit of the material which is to be used. This condition makes it imperative that the designer should adopt the grade of material he intends to use before proceeding with the calculations of the structure, and the substitution of an inferior grade is only permissible through a revision of the calculations. In order to make a selection, he will calculate the cost on the different types at his command and thus determine how much of the difference in price is overcome by the difference in amount required, giving due consideration to adhesion or bonding conditions.

In executing the design of the structure, the primary object is, of course, to obtain the maximum economy. There are usually so many factors involved in this, that it is rare that the economical section of beam can be used. The cheapest individual beam is one that requires more depth than other considerations will allow. This is true because there is a saving in reducing, at each floor, if possible, the height of the stories measured from floor to floor. This reduction of story height saves in all of the wall construction, columns, and stairways. Therefore, it is proper to diminish the depths to such point as will give in the aggregate the cheapest result.

In reducing the depth of the beams or girders, a calculator should keep clearly in mind the necessity of not sacrificing too much of the element of stiffness, which is a function of the depth of the member. This is usually safeguarded by the rapidly increasing cost due to the additional amount of reinforcing material required, which increases very fast as the depth is reduced. Having proceeded in the calculations to a point of finding out the amount of reinforcement required, there then confronts the designer the problem of properly placing it in the work. In this there is a rich field for ingenuity to accomplish desired results with the least friction and expense. The latitude is not as wide as might appear at first thought, because there are the limitations of the proper transmitting of stress to large sized bars and the avoidance of a multiplicity of small sizes.

The contractor, who is the one who passes the final verdict of expense, will usually incline to the larger sizes and so far as possible his views should be met. The most reliable tests we have at our command indicate very clearly that more strength is derived from a beam reinforced with a number of small bars than with a fewer number of larger sizes. There is also a further advantage in using a number of small bars, in that it is not possible to purchase steel on which the manufacturer will give a guarantee against flaws. If flaws were to occur in one of a few large bars, there would be far more serious results than if it had happened in one of a number of smaller ones.

A multiplicity of small bars is objectionable because of the difficulty in getting the concrete properly in position, and it seems to the writer that this objection is a pertinent one. It is imperative that there should be a sufficient amount of concrete surrounding the bars to enable them to derive the flange stress for which they have been calculated, and the details should be such as to insure this.

Under ordinary girder conditions, it is usually impossible to place the required reinforcement in one layer at the bottom of the beam. To illustrate—there came to the writer's attention some time ago a beam 8 inches in width reinforced with four 1-inch bars, the center of the bars being placed 1½ inches from the bottom of the beam. As these bars could only derive their stress from adhesion, it is a matter of considerable interest to know how the adhesive strength of the lower half of the bar is carried up to the mass of concrete above. If this be improper and 4 square inches of reinforcement be required for this size of beam, then there obtains a necessity of placing the bars in two layers. With this amount of material placed in two layers, the center of gravity of reinforcement above the bottom of the beam has been increased and the effective depth of the beam decreased. In order to properly reinforce the above member, there would then arise the necessity of increasing the amount of reinforcement and by some device providing for additional compression resistance in the upper flange of the beam.

There is no other type of construction in which conditions of continuity are so nearly perfect as in reinforced concrete. The experience of the writer with several tests of this type of construction has shown that a large additional amount of strength can be obtained by providing a proper continuity reinforcement. In fact, I venture the statement ~~that~~ it is safer in most cases to cut the amount of flange reinforcement of a beam at the center of the span, as ordinarily calculated, than to reduce the reinforcement of the upper flange at the point of support, providing this reinforcement extends a sufficient distance into the beam. A structure built without top reinforcement over the point of support is almost certain to crack. There is an unfortunate tendency in the construction of concrete slabs in a steel frame building to make the top of the concrete flush, or nearly so, with the top of the steel beams. The continuity action of the slab produces a tension over the support due to contraflexure moment, which causes a crack there, as is readily observed in floors of this type with mosaic coverings.

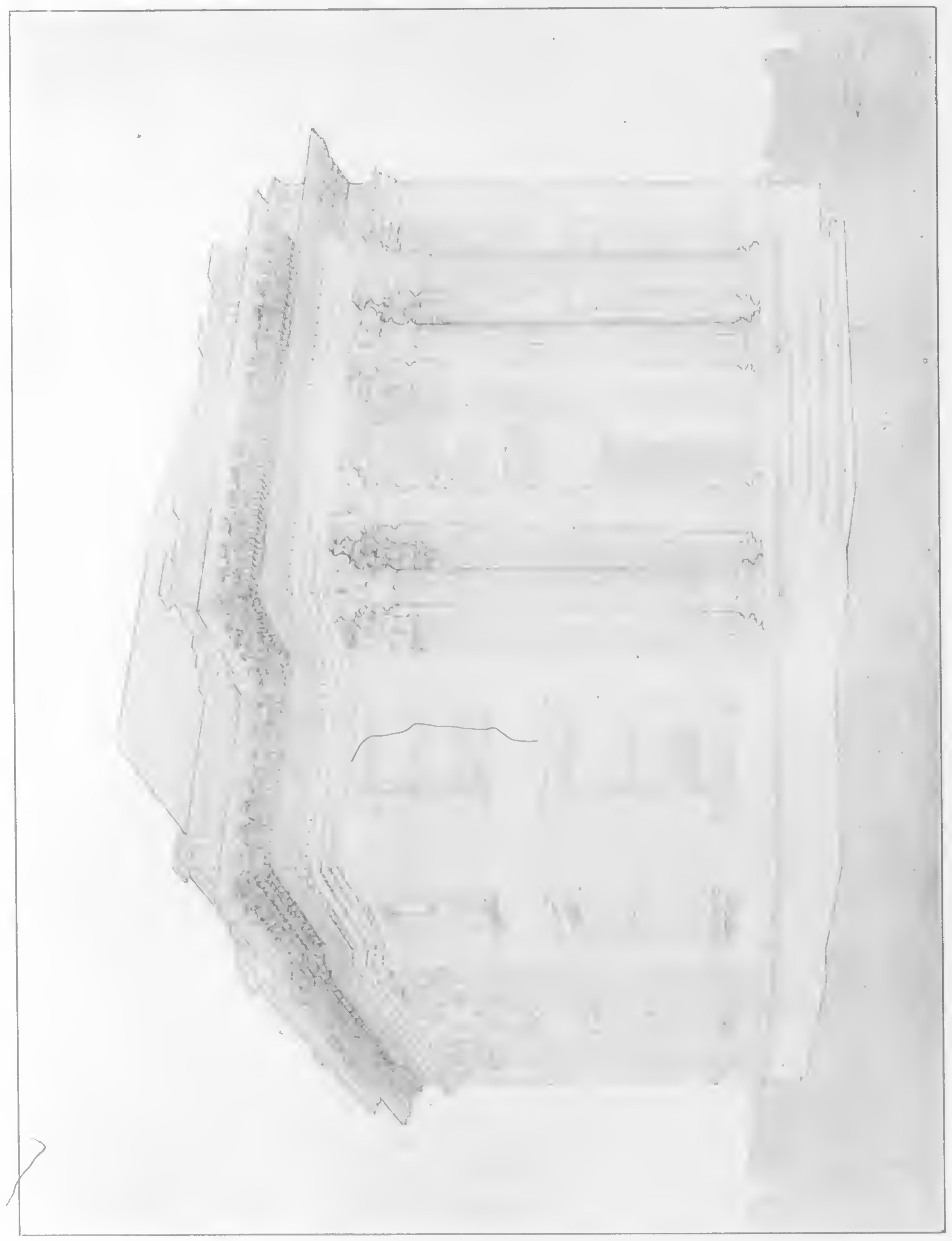
Such structures as are reinforced with indiscriminately selected steel placed in a careless or haphazard manner, can only, upon their completion, give a very unsatisfactory result and will be worthy of attention if they succeed thus far.

* * *

Not Just What He Meant

At a wedding-feast recently the bridegroom was called upon, as usual, to respond to the given toast, in spite of the fact that he had previously pleaded to be excused. Blushing to the roots of his hair, he rose to his feet. He intended to imply that he was unprepared for speech-making, but he unfortunately placed his hand upon his bride's shoulder, and looked down at her as he stammered out his opening and concluding words:

"This—er—thing has been forced upon me."—Philadelphia Ledger.



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Architects Must Do Better

By F. W. FITZPATRICK,

Consulting Architect, Executive Officer, International Society, State and Municipal Building Commissioners and Inspectors.

THE Architect and Engineer has done splendid work in pointing out the effects of San Francisco's late terrible fire, calling attention to certain weaknesses of construction and other faults. Its work has been, and rightly, educational. Would it not be a good idea to start in with a series of editorials exhorting the local architects to broaden out in their views, to study more, not to think less of mere design, but to grow up to a point where they can fit beautiful exteriors to sensible, well-planned and lasting construction.

As far as construction goes, building as well as they can, architects in other parts of the country have terrible odds to contend with. To eliminate shoddy buildings, fire-traps particularly, will take a generation's time; with the San Franciscans, it is different. Their's is virtually a clear field and they can plan and build so that there will be nothing to undo. With us in the East we have constantly to be thinking how our new buildings will be effected by their surroundings; you have your own surroundings to create. What will your architects do with their opportunities?

The people put up the money for building, they direct in a general manner what they want in the way of space, etc., but, manifestly, they cannot be expected to also direct how buildings should best be done to prevent their destruction by fire, or in the matter of their sanitation, heating, etc. That is the province of the architect. He is the expert who is supposed to know all about and to control all those details. In the vernacular, it is "up to him." How well he has acquitted himself of the task can best be illustrated by the fact that in all our country there are about 11,500,000 buildings. Their value is something like $14,500,000,000. Of all that number there are but 4000 whose authors even claim are at all fireproof. In most cases that "fireproofness" is limited solely to the structural or skeleton part of the building. In all else they are about as flimsily constructed as is the most "ordinary" building. Of those 4000 there is but one building, the Board of Underwriters Laboratory in Chicago, where all the known methods of fireproofing are assembled under one roof, but **one** absolutely fireproof building in this great country of ours! The others of even the 4000 are damageable from 20 to 90 per cent. of their cost value.

It would seem that the average architects, or even the best of them, believe that by fireproofing the structural steel with hollow tile or with the various substitutes, concrete, etc., some sort of occult transformation takes place and they are relieved by that one act from doing anything else in the fireproofing line. If you don't think that that is so glance at the illustrations and the several reports of the San Francisco fire. Had $10,000,000 more been spent originally on the buildings of that city, it would have meant the saving of at least $100,000,000 in the conflagration, or, to be more specific, if the architects of the 35 so-called fireproof buildings, exercised judgment enough to have spent $600,000 more on their construction, or rather shifted that amount from wonderful ornaments, fine marbles, to the greater essentials of fire prevention, they would have saved those buildings intact, buildings in which at least $9,000,000 destruction has been wrought. Simpler still, had the single precaution been taken of protecting the windows of those buildings, an additional expenditure or a shifting of the sum of $60,000 from frivolous ornamentation to that necessity, the interiors and contents of those buildings would have been intact today.

With those facts clearly before us and a long list of others, the accumulation of twenty-odd years' most intimate association with the practitioners, justify me in the claim that our architects show lack of skill, if not actual stupidity or criminal negligence in planning their buildings. I suppose this sounds like lese majestic, or treason, or something of that sort, but the facts are there and the sooner some one brings them forcefully to popular attention, the sooner may we expect that conditions will be ameliorated.

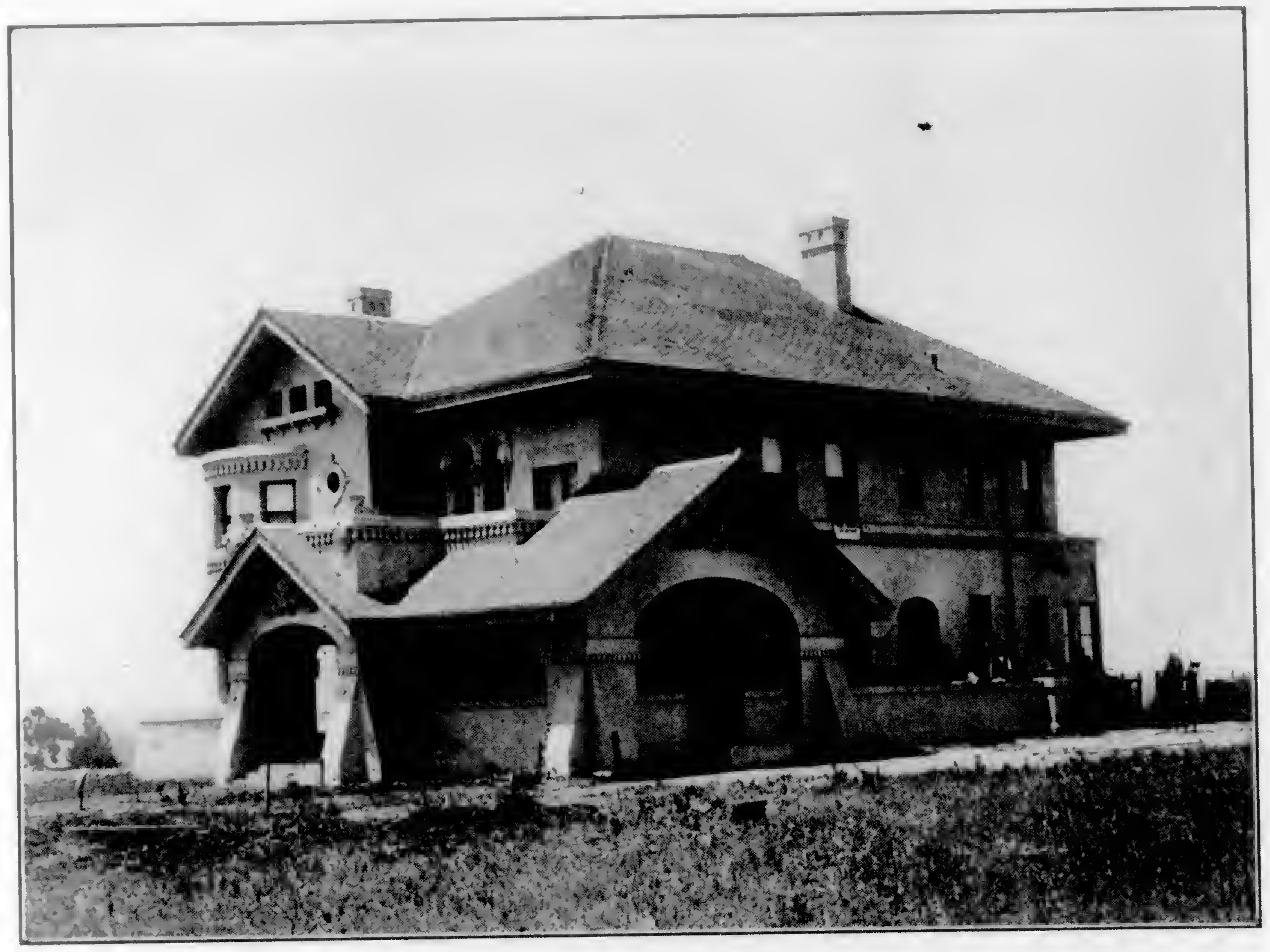
The architects' training is somewhat against them. Their earliest lessons are in the artistic line, and all too often, the schools, the older practitioners and all the influences surrounding the youngsters conspire to give them a haughty disregard for things merely practical. Let the bids on any building come to more than the owner intends spending and watch the architect tearing down to get within the limit. He will cut off the fireproofing even of the steel, he will rip out the very bowels of that building, if he can only preserve what he deems to be his beautiful exterior intact and certain mantels and other little internal fussiness. He forgets that real beauty is truth and that the very first purpose of any building is to have its interior adapted to the business for which it was built, its exterior merely clothing that interior, permanent and undamageable by the elements and then what is left of the money used for a chaste adornment or ornament of the exterior and of the interior.

Our civilization has grown very complex and with alarming rapidity, and our architects have not kept up with the procession. To put it plainly the job of building has become too big for nine-tenths of them and the other tenth who know more than their confreres are generally too busy in the executive functions of the profession, committees, dinners, social functions, the getting of large commissions, etc., that the world is really not over-much benefited by their versatility.

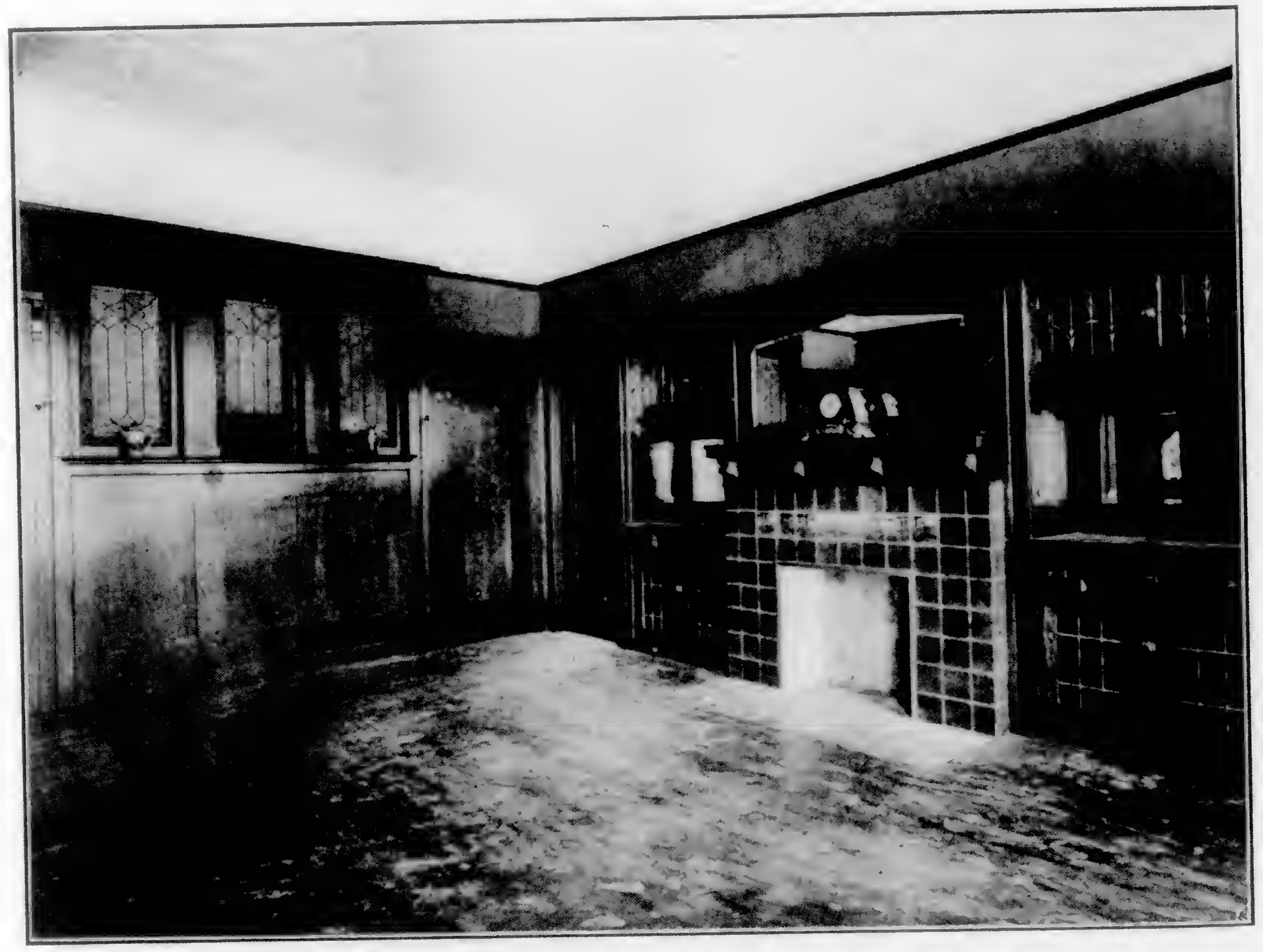
True, the structural engineer has been brought into requisition and also the heating expert, the sanitary man and so on as auxiliaries' aids to the architects. But each one makes the mistake of believing that his profession is the leading one and that all else should be subservient to it. He is jealous of everyone else and the architect, the executive officer, has a dickens of a time reconciling these various experts, adjusting their squabbles. One would think that the structural engineer's province would be to help out the architect in a general system of fireproof construction, but bless you, he himself knows mighty little about it. He is long on learned dissertations about the "modulus of elasticity in concrete," he can beautifully arrange the riveting of his columns and girders and adjust to a hair's breadth the factor of safety, he knows how to figure out re-inforced concrete—particularly the 127th patented system, his own—so that there will be less cement and far greater strength than in any other system, but he will never advise the architects to close his stairs and elevators, to make smaller his units of space, to protect his windows, or anything of that sort. He brushes that aside, that is not engineering to him.

It resolves itself into this that if the architects themselves don't know enough—and they certainly have not shown any wonderful acumen in the matter heretofore—about fire-prevention to properly devise and plan and construct their buildings, and are too jealous of their own high prerogatives, and supposed all-covering knowledge to call in experts who do know how to adjust and connect *all* the branches of building so that one does not vitiate the other, then it is clearly "up to the" owners of projected buildings to take the matter into their own hands and have their plans passed upon by a real fire expert such as Mr. Reed of the Committee of Twenty, for instance, before they begin actual operations. These operations frequently consist, so to speak, in figuratively shoving hundreds of thousands of dollars into a rathole. Business men take the very greatest precautions before going into ordinary business deals. If it is real estate, they have the titles examined and everything done up in excellent form; if at law, they carefully select their attorney and he must be a man who knows all about that special kind of litigation and has made a success of it. When it comes to building, a transaction that involves often times a hundred-fold as much as his other deals, he will confide himself body and soul, as it were, to a young cousin of his wife's, to the protege of some friend or other more or less unknown and very possibly incompetent fellow whose principal equipment in a professional way is the sign over his door "Architect." The result is that fire costs us, for smoke, fire departments, money wasted in insurance, etc., a sum equal to five per cent yearly on $10,000,000,000. In other words that capital might be termed the amount we have invested in stupidity!

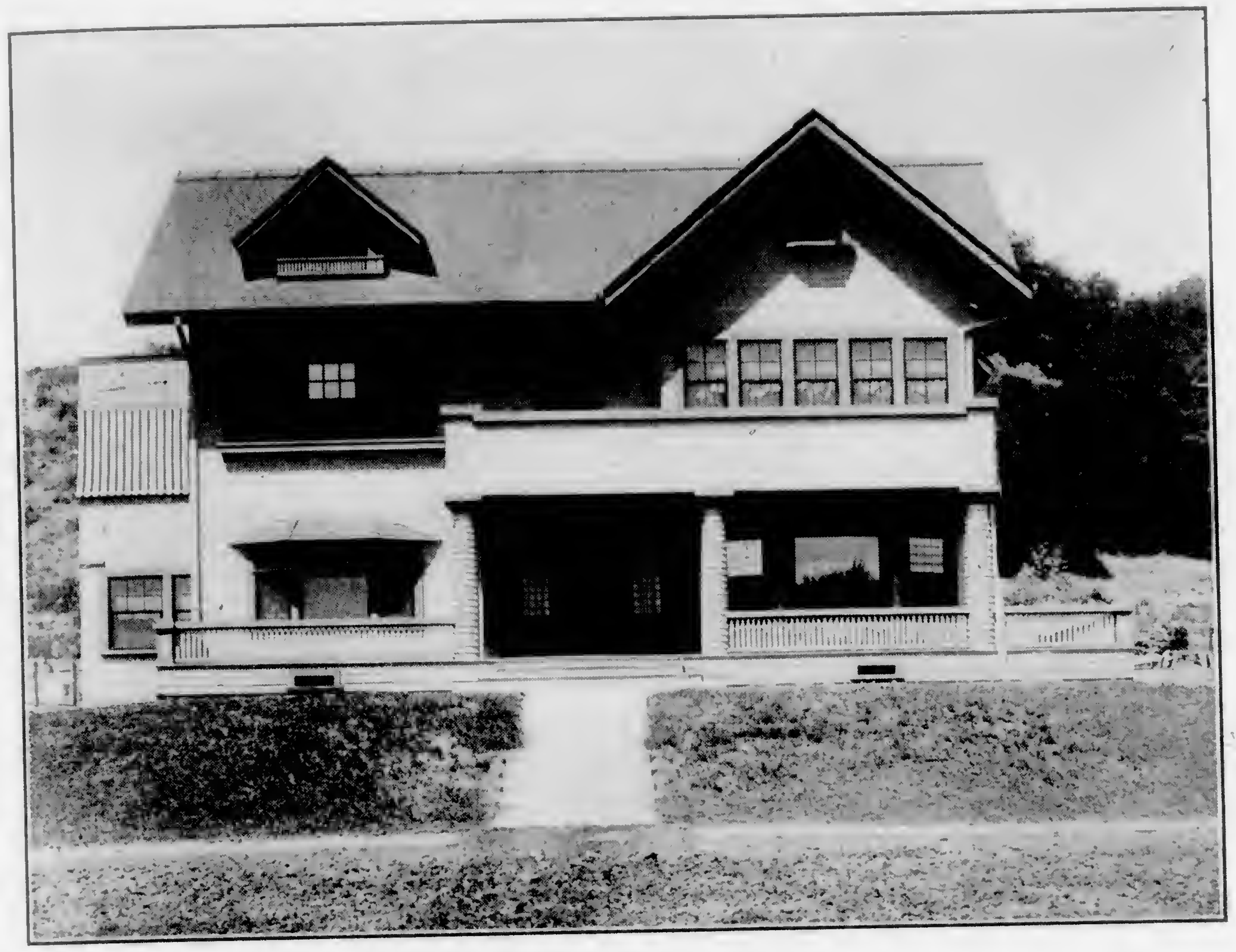
Under proper direction, in a generation's time or so, if most of our flimsy buildings have been destroyed and a better class built, really full-fledged fireproof construction, with its attendant increased first outlay, will not be so necessary. In a town where all the buildings are simply incombustible, the precautions we have to take now to make a building fire-resisting, will not be needed. There is so much inflammable all about us, fire and conflagrations hazards are so great, so ever-present, that the very top-notch of precautions have to be taken with the buildings that *are* built now whose owners have any desire to preserve them. It is a condition that has been brought about by our own folly, or, to be more specific, our architects' rank incompetency. We have to face that condition, and for a time go to an extraordinary expense and exercise the utmost care to make our buildings superlatively fire-resisting. The architect has not done so heretofore; that he will do so hereafter is a matter of some doubt. The engineer (nine out of ten of him) is purely and solely, a structural specialist. The fire experts are few and far between and the chances are that the great bulk of our people will have to be satisfied with insisting upon their architects complying with the generalities of the art of fireproof construction as set forth in technical journals that really give any attention to that most important subject. If a man desires to learn another language than his own the proper caper is to get a teacher who knows that language thoroughly, the country, its customs and all about it; if he cannot afford that then he can at least get a smattering, a dab at that language, perhaps enough to keep him from being led astray in that strange land if he visits it, by studying "French at a Glance," or some of those other many text-books, that are indeed most helpful. A little knowledge of a subject, some very ancient authorities to the contrary and notwithstanding, is infinitely better than absolute ignorance thereupon. It will at least show one how much more there is to be known and perhaps give him a proper appreciation of how very little he does know and an incentive, a willingness to acquire more if it is at all gettable.



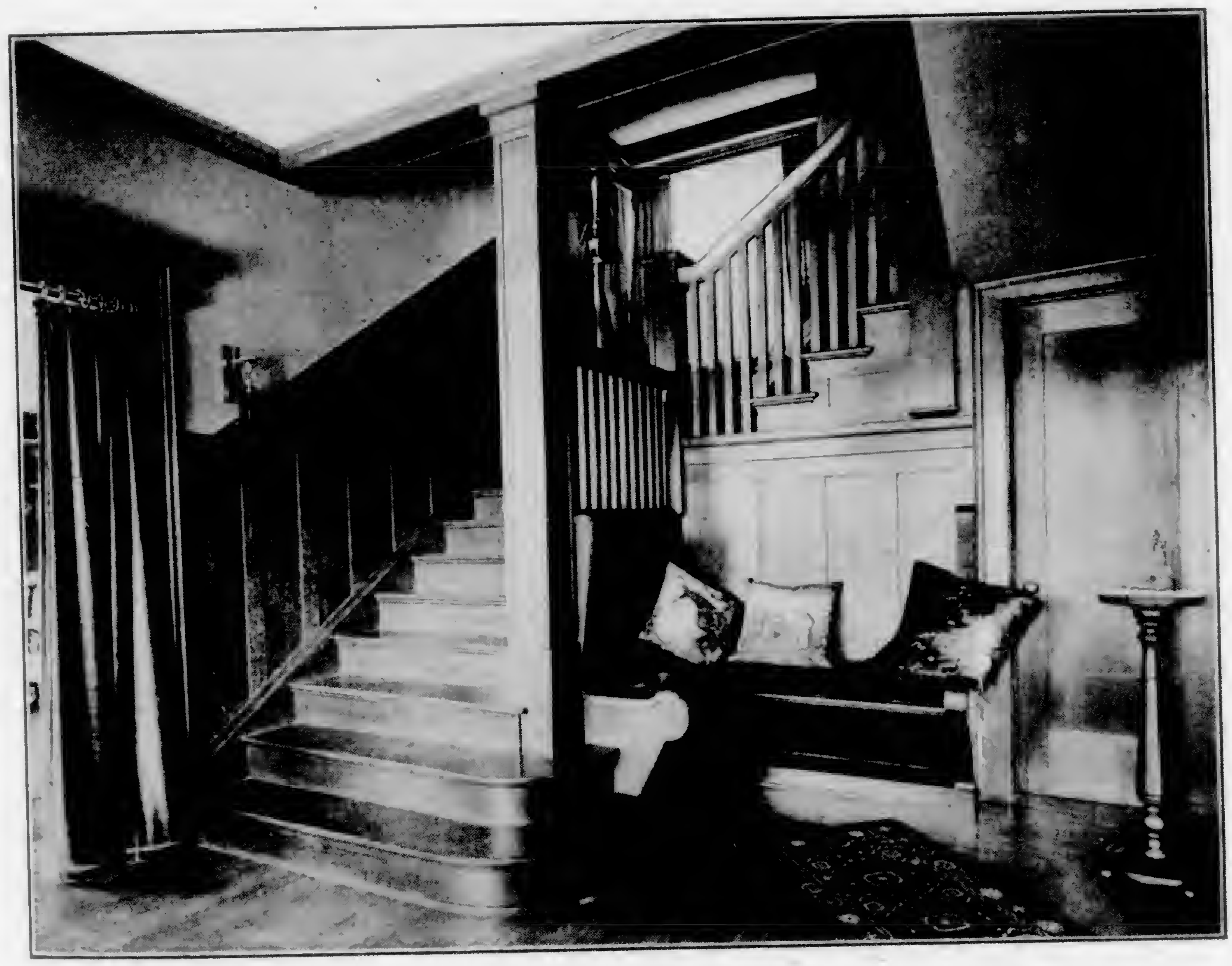
The Pellisier Residence, Los Angeles
Fernand Parmentier, Architect



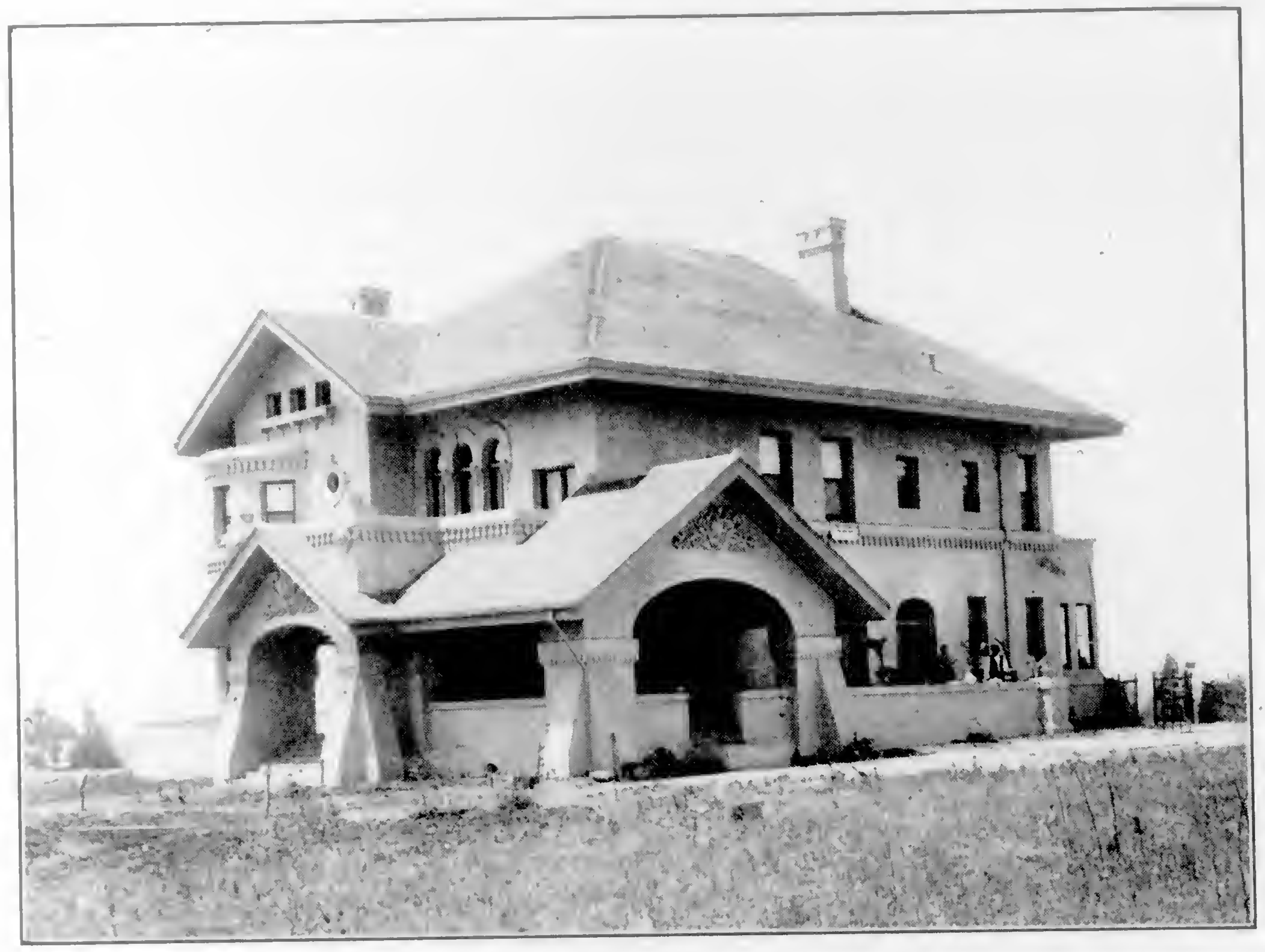
Corner of the Dining Room in the Pellisier Residence
Fernand Parmentier, Architect



Residence of Mr. F. P. O'Connor Los Angeles
Fernand Parmentier, Architect



Hallway and Staircase in Residence of Mr. F. P. O'Connor. Los Angeles
Fernand Parmentier, Architect



The Pellisier Residence, Los Angeles
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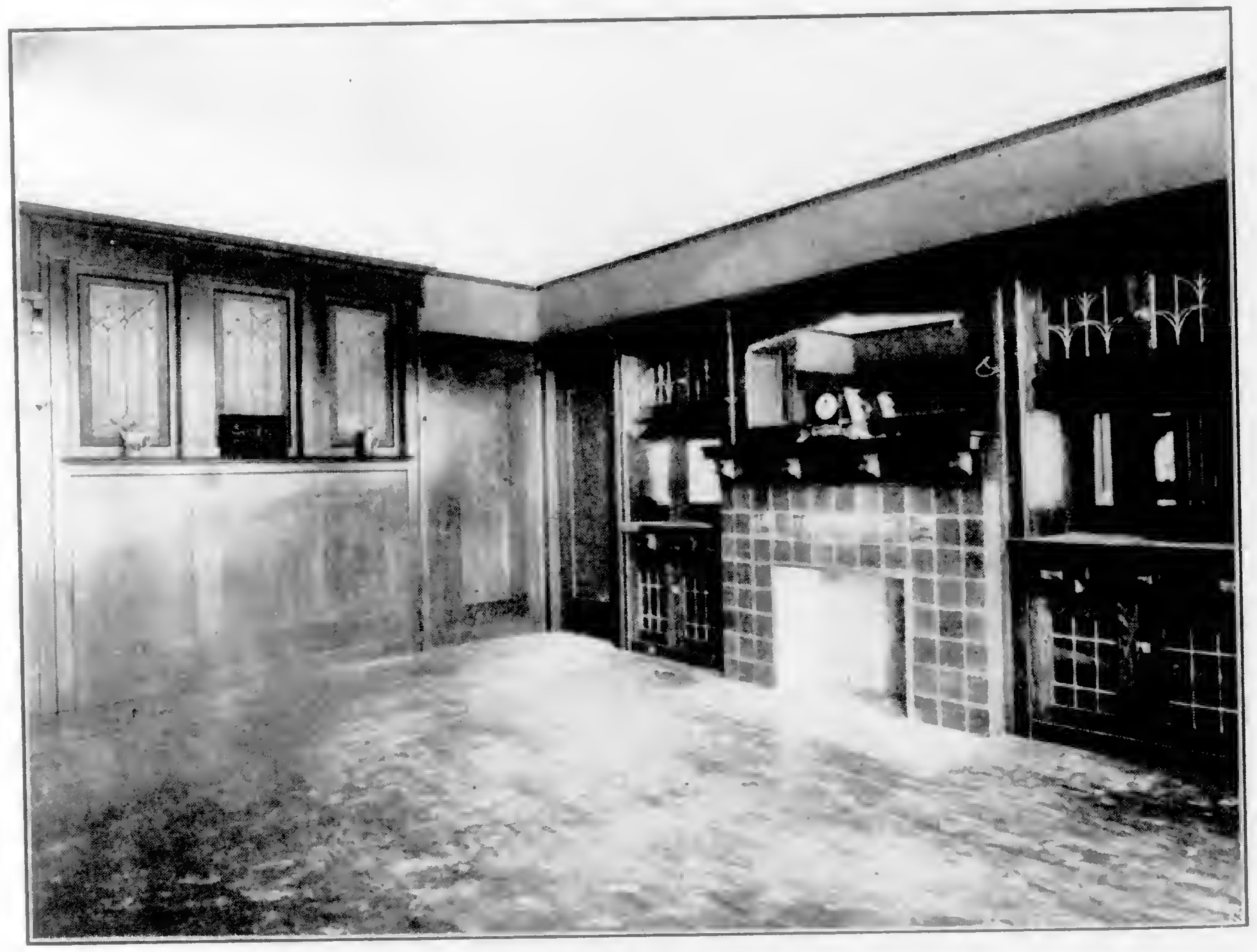

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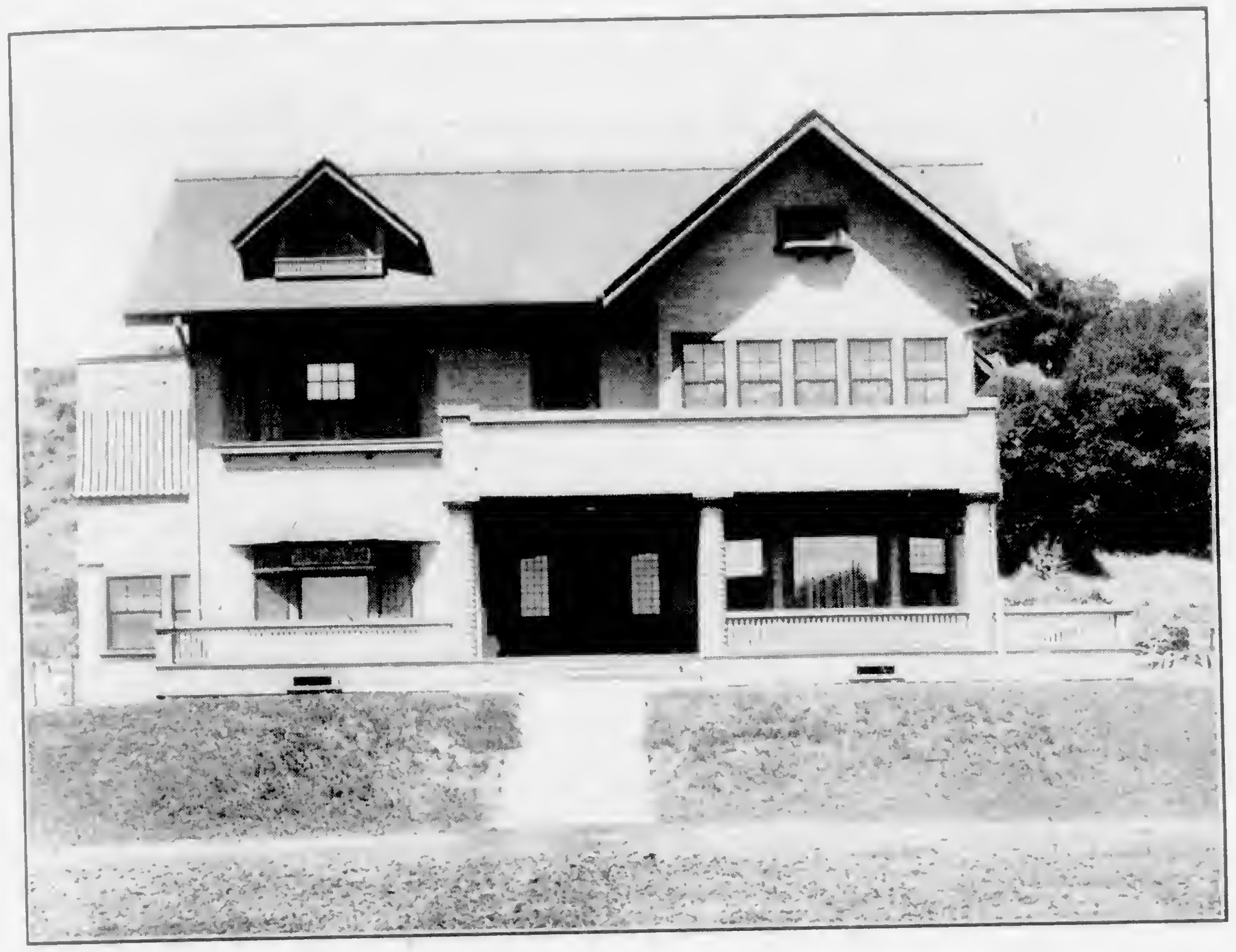

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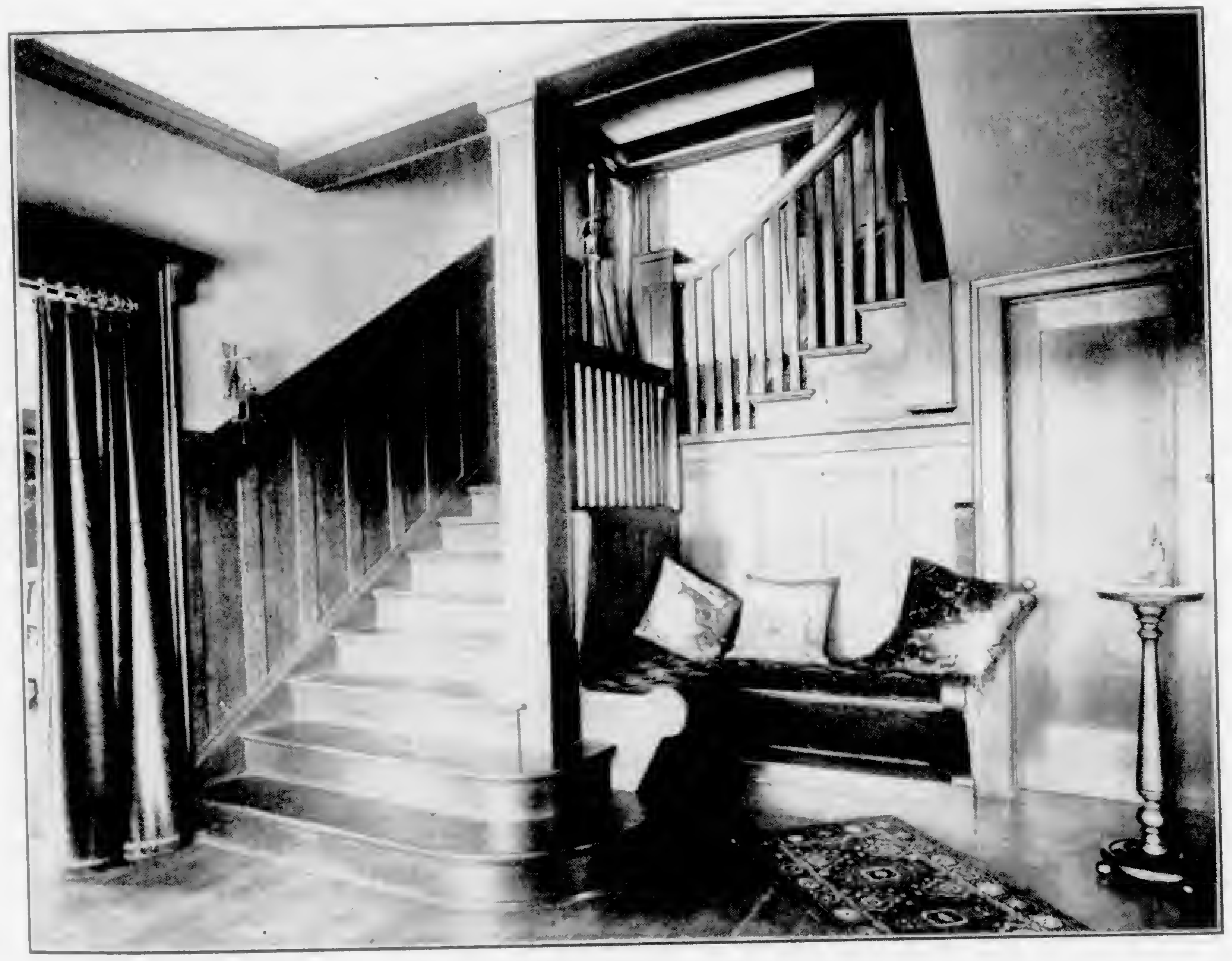


Hallway and Staircase in Residence of Mr. F. P. O'Connor, Los Angeles
Fernand Parmentier, Architect

Shelter First---Then Permanency

By THEODORE STARRETT, of the Thompson-Starrett Company.

WHAT can one now say about the rebuilding of San Francisco that has not been said a dozen — yes, a hundred — times, before? Prophesies of the city's future have run the entire gaumet from total abandonment on the one hand to complete rehabilitation in a twelve-month on the other—a rehabilitation in which perfection would be attained, an ideal city beautiful with all the defects of the original city eradicated.

Neither of these extremes can or will come true. The abandonment of the town is an impossibility, as anyone who studies the situation will quickly admit. Look at the map and see what San Francisco is—the heart of a vast traffic, grown in response to natural demands. And this heart is simply stripped of its shelter for a time. In the first shock of the rude uncovering the city paused for a brief moment. Men spontaneously intuitively, without putting the idea into words, her citizens with one accord rushed to the work of repair.

Let the extremists, of which every class, pessimist or optimist, shout and preach as they may, San Francisco will pay no heed to them. Without another pause she will do the one thing to do: She will repair her covering. Her vast business needs a roof to cover its nakedness and a roof it will make for itself regardless of friend or foe. After the shelter is made plans for permanent housing will be considered.

I once read a story in a newspaper in which the great city was compared to a palimpsest or manuscript parchment used over and over again by the monks in the middle ages. The first writing was erased to make way for a second. Then another monk would have his story to tell and he would erase again, and so on. The site of a great city is a palimpsest. The number of records written and then erased and then written again only to be erased again would make the rarest palimpsest turn green with envy.

Everything in the city destined to greatness is subject to change and replacement. Nothing can be built big enough nor correctly enough to take care of the future, for the very good reason that even though prophets, were among us to tell how to build for all time, they would get little heed. I think the saying that a prophet is not without honor save in his own country must have been made for these. Perhaps it is for the best after all. The city of Washington was laid out by prophets in the persons of the father of his country and his advisers, but no other great city has had the luck to be so conceived, or being conceived, the luck to survive. A divinity must have had that city under her tutelage.

But Washington is the exception which proves the rule. The business interests which are responsive to the pressure from all along the great arteries which focus at San Francisco cannot wait for prophets and dreamers, and so the town site is being "carpeted" with temporary buildings as quickly as possible.

When the "carpeting" is done, then will be time for beautification with widened streets and civic centers and all that sort of thing. And the sooner and more shabbily the work of "carpeting" is done the better the chance for the new story which the modern palimpsest shall tell.

The activities which are now starting up in San Francisco are startling in their significance and their potentialities. A boom is upon the city like that which occurs on the occasion of the building of some great World's Fair, but this World's Fair will exceed five—yes, ten-fold—any fair that we have ever known and the best part of it is there will be no recoil or reaction such as has occurred all too often in the case of some of them.

The Chicago World's Fair taught a wonderful lesson to the people of the United States and of the World, and Daniel H. Burnham is beginning to have a foretaste of the immortality that shall be his because it was he who saved it from mediocrity; it was he who fought to make it the beautiful Dream City which marked the step by which America took rank with France as a country of fine architecture.

San Francisco does herself proud by being one of the first cities, if not the first, to show an appreciation of Mr. Burnham and his work. It is to be sincerely hoped that no selfish and narrow interests will turn the city from her destiny, the City Beautiful, by defeating the plan of getting Mr. Burnham to guide the rebuilding—not the first rebuilding, for that will take care of itself—but the second rebuilding, when, if San Francisco gives ear to her best men, she will make a palimpsest with but two more narratives, the second one so beautiful that none will dare to erase for a third rebuilding.

* * *

Wanted: Fire Insurance

AS the result of frequent conflagrations in the congested districts of cities in the United States, fire underwriters are beginning to "unload" a portion of their liability in those places as a precautionary measure.

This means that business men and owners of property in congested districts cannot ignore much longer the fact that sooner or later they must protect themselves against losses by fire, instead of relying solely on fire insurance.

There are two reasons for this threatening situation: (1) The fire hazard under present conditions, conditions which favor the destruction of blocks of the most valuable business property in a single fire, is almost uninsurable. (2) Frequent conflagrations in congested districts must have the effect of diminishing the amount of fire insurance obtainable, leaving large property values not protected.

From the year 1860 to the year 1904, both inclusive, the stock fire insurance companies doing business in the United States issued policies for amounts aggregating $442,225,685,657. The premiums paid for that insurance amounted to $3,622,406,354.

The amount represented by the policies bears witness to the importance of the whole matter; to the fact that we are a thriftless nation in creating such tremendous fire hazards; and the amount represented by the premiums is a part of the tax we have paid for our stupidity and recklessness.

Every merchant and every property owner pays for his own fire risk and a part of his neighbor's—the "exposure" hazard.

To protect credit, business men must face the situation as it is, or will be, and be prepared to "carry their own risk." Unless this is done, untold embarrassments must ensue.

The situation may be met by adopting fire-resistive construction for buildings, equipping them with modern appliances and apparatus for discovering and extinguishing fires, and by protecting every building against the spread of fire from one building to another—The "exposure" hazard.—*Insurance Engineering.*

Advise Steel Frame and Reinforced Concrete for State Buildings

AT the request of the State Lunacy Commission, John Galen Howard, architect, and John D. Galloway, engineer, both of San Francisco, have made an examination of the State hospital buildings at Agnew which were badly damaged by the earthquake, and the report of the two experts brings out some important points affecting future building in California. Reid Bros., architects, have also submitted a report which is in perfect accord with the recommendations of Messrs. Howard & Galloway. By courtesy of Dr. Stocking, superintendent at Agnew, both reports are herewith made public for the first time:

The State Lunacy Commission, Capitol Building, Sacramento, Cal.

Gentlemen:—In response to your letter of August fifteenth, we made an examination of the buildings at the State Hospital at Agnews, on August eighteenth, Dr. Stocking being with us in our investigation. Plans of the various buildings were furnished us, in addition to which, the foundations had been exposed in places in such a way that their character could be determined. As all the buildings were constructed with a basement, it was possible to examine the foundations with ease and a knowledge of their condition could be obtained.

We agree with the statement made in your letter that none of the superstructures of any of the buildings is available for use. The walls of all the buildings are so badly shattered that they should be taken down to the foundations.

The question which arises as to the value of the present foundations in any reconstruction on the Asylum, necessarily involves the discussion of the type of building construction best adapted to withstand the effects of earthquakes. Authorities are agreed that in the earthquake, there are two principal movements of the earth, vertical and horizontal, the latter being the greatest in most cases. The result of the horizontal vibration of the earth is a tendency to shear the walls along a horizontal plane, the inertia of the mass of the building preventing it from following the earth motion. Such effects may be seen plainly in the men's cottages at the Asylum, where entire walls moved from two to three inches, or were entirely overthrown. The vertical movement of the earth raises one portion of the building, thus cracking the walls. The net result of the two earth movements is that a swaying motion is produced in the building, causing the destruction of brick walls, cracking of plaster and movement of roofs.

Obviously, in a region subject to earthquake shocks, a building should be constructed to resist the kind of stresses induced by the earth movement. Brickwork or stone masonry, laid in courses and without adequate binding and bracking elements, is the poorest form of construction possible in the case, especially if mere lime mortar is used. The horizontal joints of mortar are immediately broken and once this occurs, there is a destruction of the walls.

What is needed in a building, designed to resist earthquake stresses, is a continuous frame from the foundations to the top, possessing rigidity, but elastic, so that when deformed, it will return to its original shape without substantial injury to the parts. Brick and stone masonry are very rigid but totally inelastic. Once movement of any kind takes place, there is a breaking of mortar joints and once these are broken there is no tendency whatever to return to the original position.

The movement of a brick building causes diagonal stresses in the walls, which the mortar joints are incapable of resisting. In all such structures, therefore can be seen the diagonal cracks crossing each other like a letter X, and in most cases completely disintegrating the wall.

The question arises here as to whether, if the masonry be formed with joints of cement mortar, the result would be better? This would depend upon the intensity of the shock. Such a structure is practically rigid and would resist the earth forces by the strength of joints, without yielding, as it is inelastic. This is shown in the Appraisers' Building in San Francisco. If the forces are too great to be resisted thus, the resulting destruction is greater than in the less rigid structures. A case to the point is the tower of St. Patrick's Academy at Menlo Park. The buildings there were exceptionally well built, Portland cement being used with the lime in all the joints. The central tower was built with all joints laid in Portland cement, no lime being used. The destruction was not as great as at Agnew but the tower was completely destroyed. This but calls attention to the fact that elasticity and not extreme rigidity should be the thing sought for.

A consideration of all the forces liable to affect a structure, its own dead weight and the horizontal and diagonal stresses caused by earth motion or wind pressure, leads to the conclusion that only by supplying a frame made up of continuous vertical members and horizontal beams and girders, thoroughly tied together and properly braced, can a building be made that will resist the earthquake shock.

One solution of the difficulty of making a structure to resist earthquake stresses is found in wooden frame buildings. Here the vertical studding resists horizontal stresses when properly braced with diagonals. Relatively few modern buildings of this class failed and most of the failures can be traced to poor foundations or an actual sinking of the earth.

Another solution is found in the frame of reinforced concrete. Properly designed, such a structure has vertical columns and horizontal beams and girders that allow it to resist earthquake stresses. The material is elastic. Some few cases exist, such as Roble Hall and the old portion of the Museum at Stanford University and a factory building in Alameda that withstood the shock without material damage.

In the opinion of the writers, however, the best form of structure to resist earthquake shocks is the steel frame, combined with reinforced concrete floors and walls. Excepting the walls, which were of brick, there were about twenty buildings of this class in San Francisco and Oakland that withstood the shock without substantial damage.

Reference is here made to structures, where the steel frame supported the entire weight of walls, floors, etc. Buildings, of which there were about twenty-five in San Francisco, with a steel interior frame and concrete or tile-arch floors but with self-supporting walls, fared nearly as well.

Coming now to the buildings at Agnew, the foundations of all of the main buildings and one of the cottages are of brick. Those of three of the cottages are of concrete. Speaking generally, all work below ground line is in as good condition as when built. Up to the first floor level, most arches are cracked at the crown and in many cases brick piers, large and small, are cracked, many being completely shattered. Concrete walls under cottages are intact, excepting a few minor cracks. The light brick walls above this concrete are generally broken.

We cannot recommend the rebuilding of the structures in brick. The original plans were made upon lines of common practice, except that

9-inch walls, such as are used in cottages, are not good practice. The workmanship was but ordinary, the lime mortar being of indifferent character. Probably better workmanship would not, however, have saved the buildings, the fault being in the type of construction. To rebuild in brick would be but to invite similar destruction in the future.

If the Asylum is built of timber framed structures, the present foundations are adequate, with such repairs above the ground line as might be found necessary by the architect. About twenty per cent of the interior piers and walls above the ground line should in any case be rebuilt. In the opinion of the writers, wooden buildings are wholly unsuitable, except as the merest temporary makeshift. Such structures are cheaper but the cost of maintenance and insurance, their rapid deterioration and the danger from fire would seem to render their use out of the question in a permanent public institution like that at Agnew.

We recommend as the type of structure to be adopted for the Asylum buildings that with a complete steel frame, properly connected and braced, combined with reinforced floors and walls. Partitions should be made of solid cement mortar, on a frame of steel studs and metal lath. The present frame of the water tower at the Asylum, which is without injury, illustrates the type, without the floors and walls.

If such a type be adopted, the present foundations would be inadequate and should be abandoned. This type of construction concentrates the weight of the structure on isolated piers under columns, and as the present foundations are under continuous brick walls, they are not adaptable, either in form or in method of construction.

We strongly recommend to your Commission the advisability of adopting the above suggested type of construction. Experience has shown that it is little damaged in an earthquake, is practically fireproof, even in a general conflagration, to which the Asylum buildings are not exposed, and is superior to all types in sanitary value. An erroneous impression exists that this type of construction is very costly. In but few cases does the cost exceed by more than ten or fifteen per cent that of a building with brick walls and wooden floors. In the case of the Asylum buildings, where all partitions were of solid brick, it is believed that the proposed type would have been as cheap as the ones constructed. It is believed that the old brick now on hand could be broken up and used as concrete, thus effecting a considerable saving. Experiments are now being made at the State University to determine this.

Reinforced concrete buildings without steel frames might be used, but as there were but few instances of this class of buildings subject to the earthquake, we do not consider this type as a settled one. If such be adopted, great care should be exercised in the selection of an architect. The type is relatively a new one, and while a number of persons are posing as experts in that form of construction, but few are competent, either from experience or study, to correctly design and execute such structures. Great care in the making and placing of material must be exercised. This must not be understood as discrediting reinforced concrete, but as a suggestion regarding it, if it is used.

Summing up, we note the following points:

Brick buildings even of the best construction were destroyed by the earthquake of April eighteenth, 1906.

Buildings of timber frame were little injured.

Buildings with a steel frame, properly braced, were uninjured.

A few low reinforced concrete buildings were uninjured.

The foundations at Agnew are, with few exceptions, in good condition to rebuild:

(a) With brick walls as formerly constructed;

(b) With timber framed structure.

We cannot recommend (a) as it simply invites future destruction.

We recommend (b) only as a temporary makeshift in case money is not immediately available for better building.

We recommend the steel frame and reinforced concrete for the rebuilding.

In case the recommended type of construction is adopted, viz: a steel frame with reinforced concrete walls and floors, the present foundations are not adapted for use and must be discarded.

The cost of the recommended type is but little, if any greater than that of the present structures.

If buildings of reinforced concrete be adopted, the height should be limited to two stories and only specially experienced architects and workmen be selected. In this type of construction, the present foundations are not adatable and should be discarded.

We suggest what is known as the "Cottage Plan" for the rebuilding.

Possibly we have gone beyond the limits desired by your Commission in the discussion, but as the use of the foundations necessarily involves consideration of what rests upon them, we have treated the subject in its entirety.

Respectfully submitted,
(Signed) JOHN GALEN HOWARD,
(Signed) J. D. GALLOWAY.

The report of Reid Bros. follows:

Hon. Board of Management, State Hospital for the Insane, Agnew, Cal.

Gentlemen:—Acting by request of your board, we beg to make the following report on the condition of the main Asylum buildings at Agnew:

The cottages should not be repaired or restored on the present founda-

The foundation walls of the Administration Building, and the wings thereto, formerly occupied by male and female patients, can, up to the level of the under side of first floor joist, be made at small expense, as strong as they ever were.

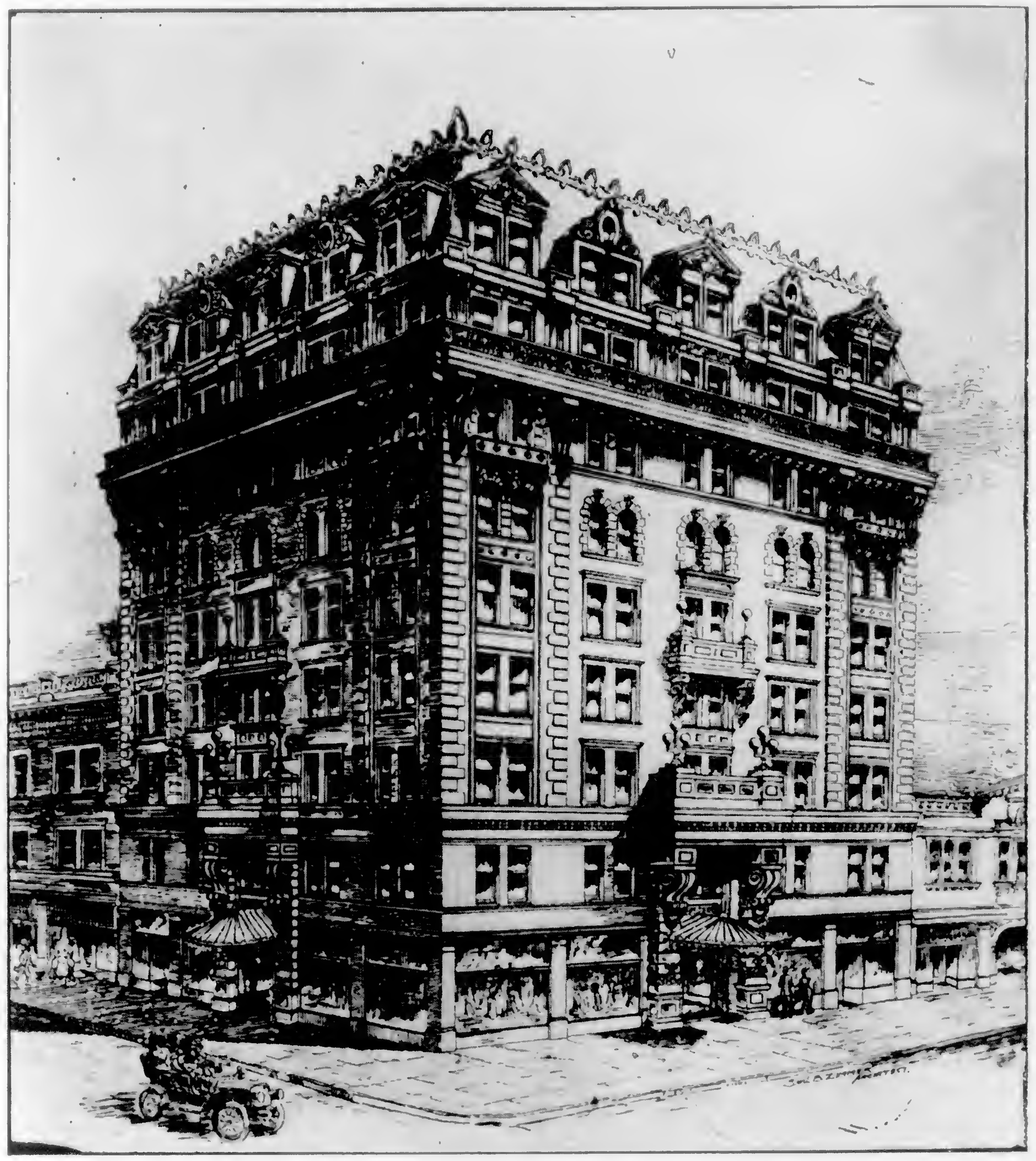
The use of the walls so repaired, however, would compel a system of construction similar to the old, and since experience has shown such construction to be unsuitable for the purpose, we consider it inadvisable to attempt restoration on the old lines.

The belief, long entertained by building engineers, that steel cage construction (carrying all walls on the steel) with a good system of floor arches, would prove stable under any conditions likely to arise, having been confirmed by late events, we believe such system offers the best means of obtaining relatively economical structures capable of affording absolute safety to occupants.

When the area of ground for the purpose is ample, as in this case, it will in our opinion, from the point of increased safety, convenience of operation and architectural beauty, be best to build only two stories above basement.

We are unable without access to the drawings of the old building, or more accurate information than we now have as to the floor space required, to estimate the increased cost of steel fireproof construction, over the system employed in the old work.

Since, however, the brick now on the grounds are of good quality, and if properly cleaned, can be used again, and as it is probable that (in the light of experience gained in the operation of the institution) a con-



Design for Odd Fellows' Temple, Oakland
S. B. Zimmer, Architect

siderable saving of floor space can be made, or its equivalent found in accommodation for an increased number of patients, if the old area be still retained, it would appear practicable to keep the cost of rebuilding within a limit not greatly in excess of the expenditure required for restoring the building on the old lines.

Yours very respectfully,
(Signed) REID BROTHERS.

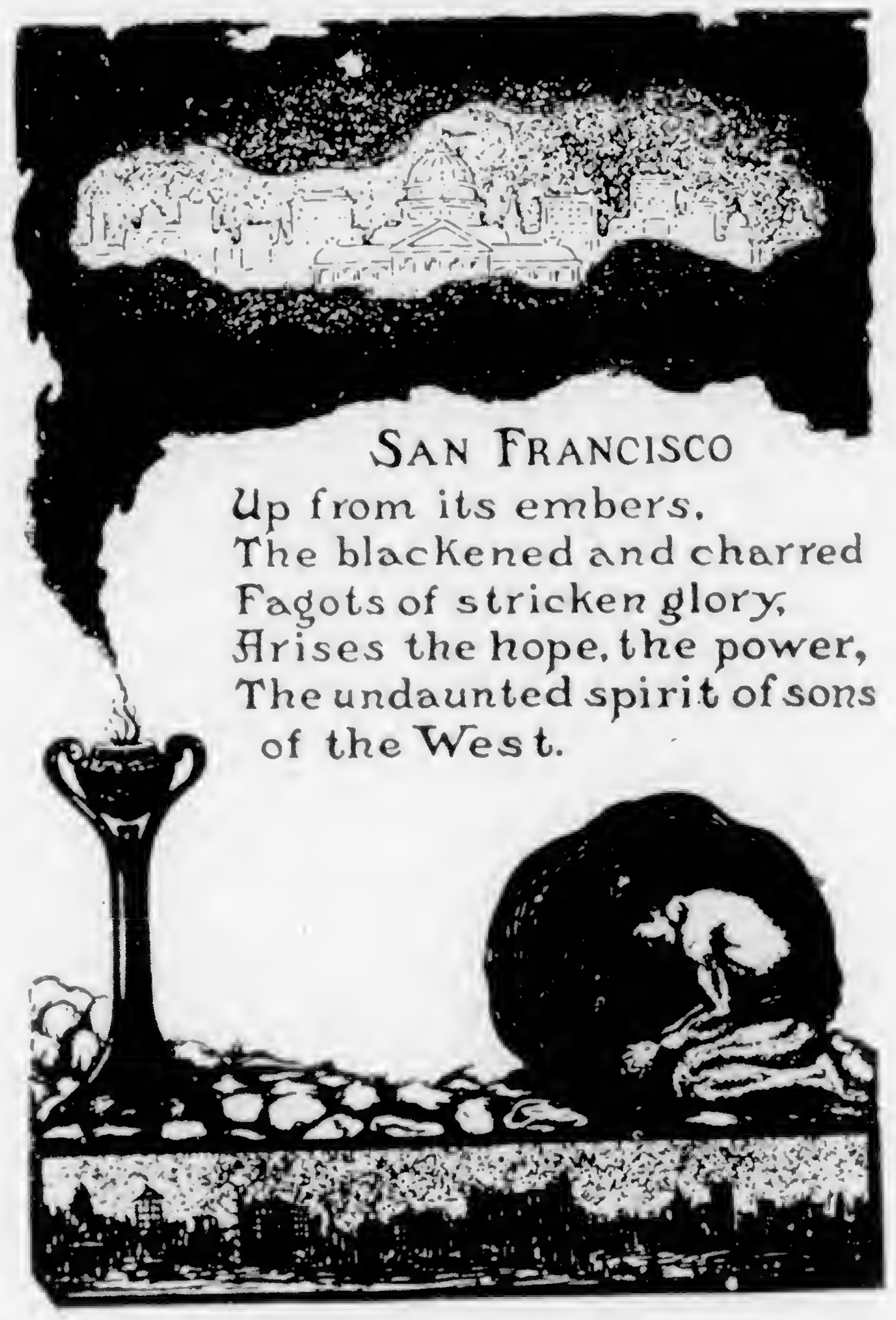
September 12, 1906.

* * *

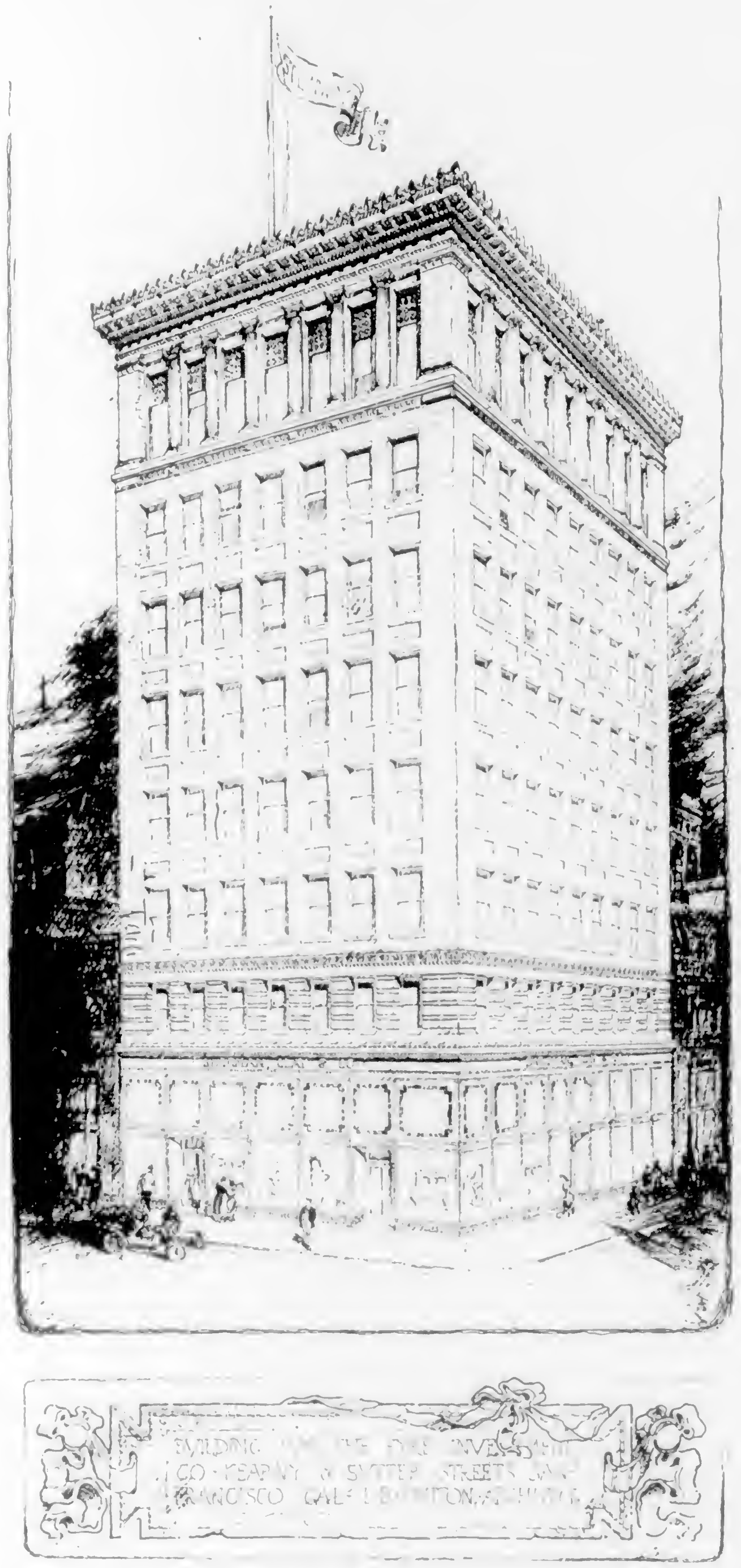
"Mr. Jones," said the office boy, "I got ter get off dis afternoon. Me gran'mother is dyin'." "I've something for you to do to-day, Johnnie," said Mr. Jones; "but you may go at 4 o'clock." "Aw! wot good is 4 o'clock?" —Judge.

For the New San Francisco

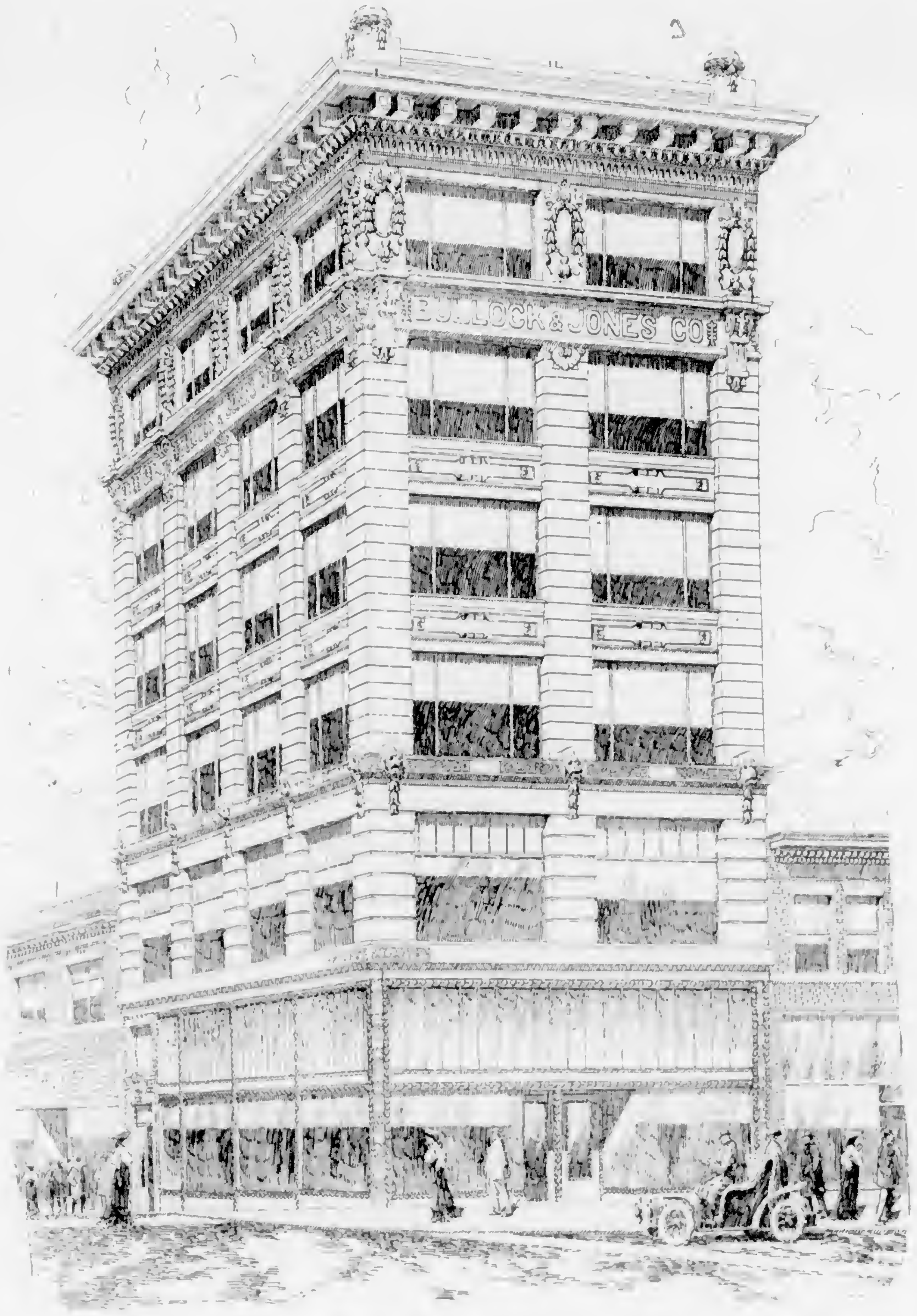
Being a Series of Architects' Drawings of New Buildings for Immediate Erection in the Metropolis of the Pacific Coast.



SAN FRANCISCO
Up from its embers,
The blackened and charred
Fagots of stricken glory,
Arises the hope, the power,
The undaunted spirit of sons
of the West.

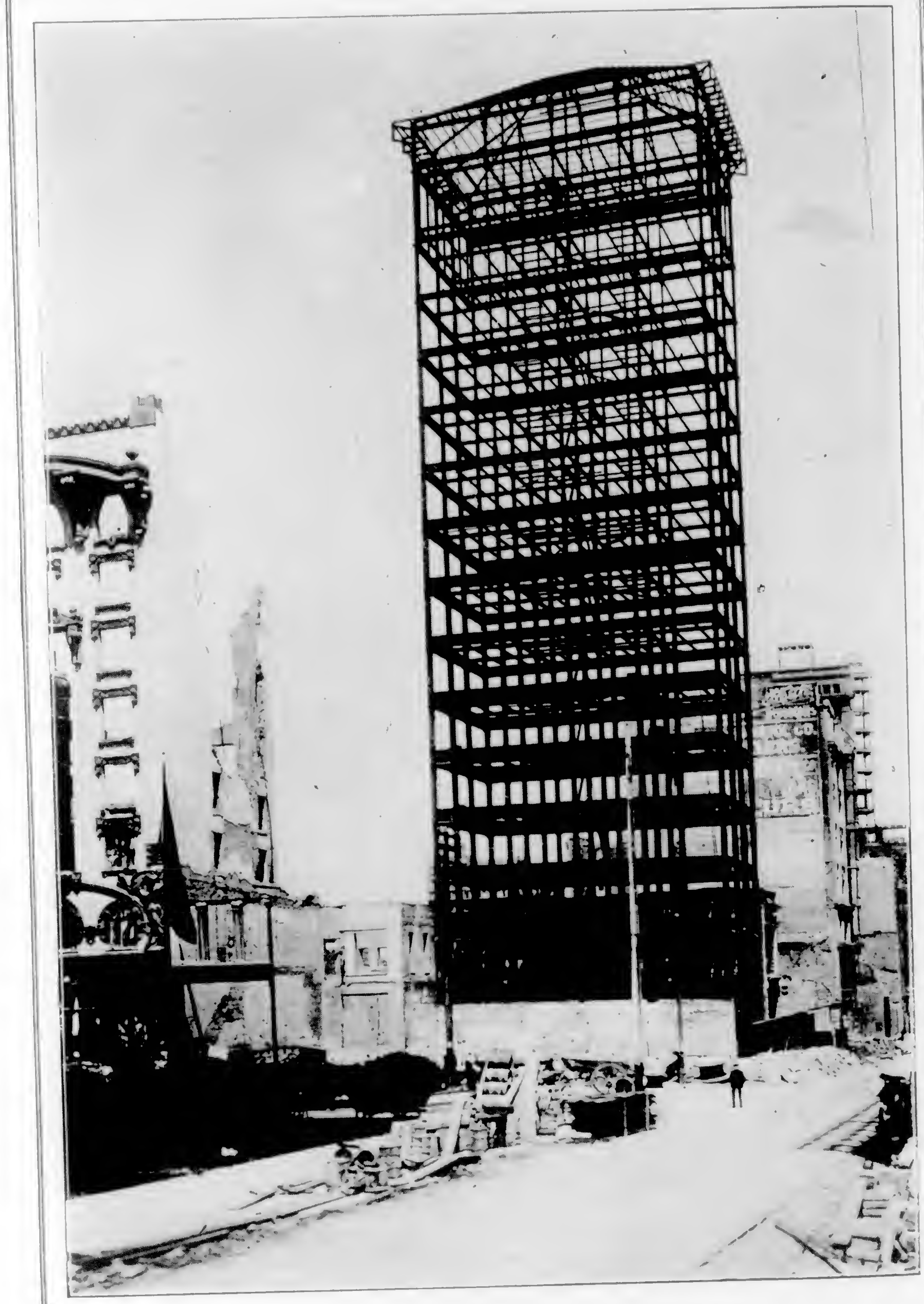

BUILDING FOR THE FIRE INVESTMENT
CO · KEARNY & SUTTER STREETS SAN
FRANCISCO CAL · [illegible] ARCHITECTS

Thompson-Starrett Company, Contractors

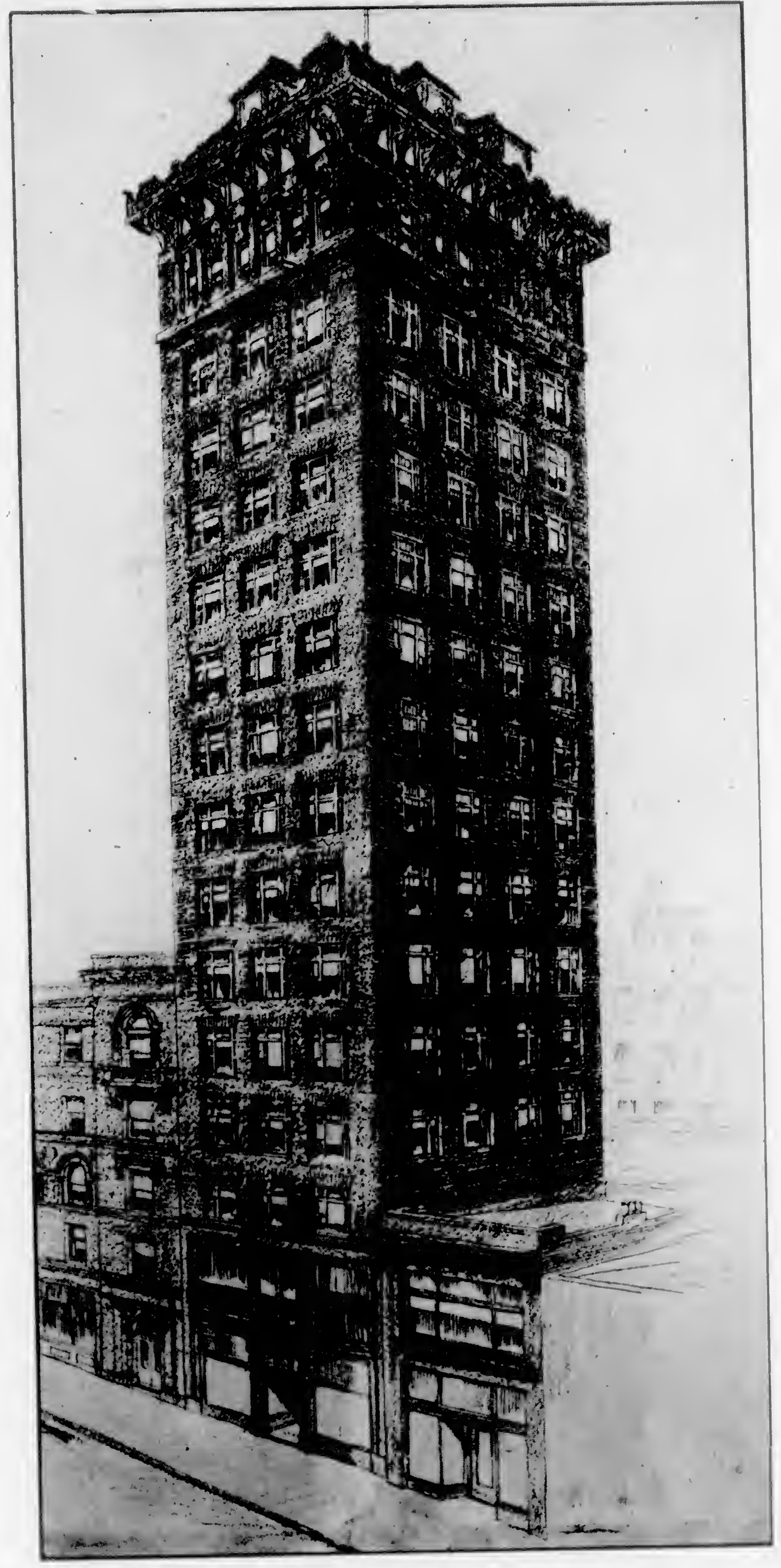


Store Building for Mr. Lewis Meyerstein to be Built at the Corner of Kearny and Post Sts., San Francisco

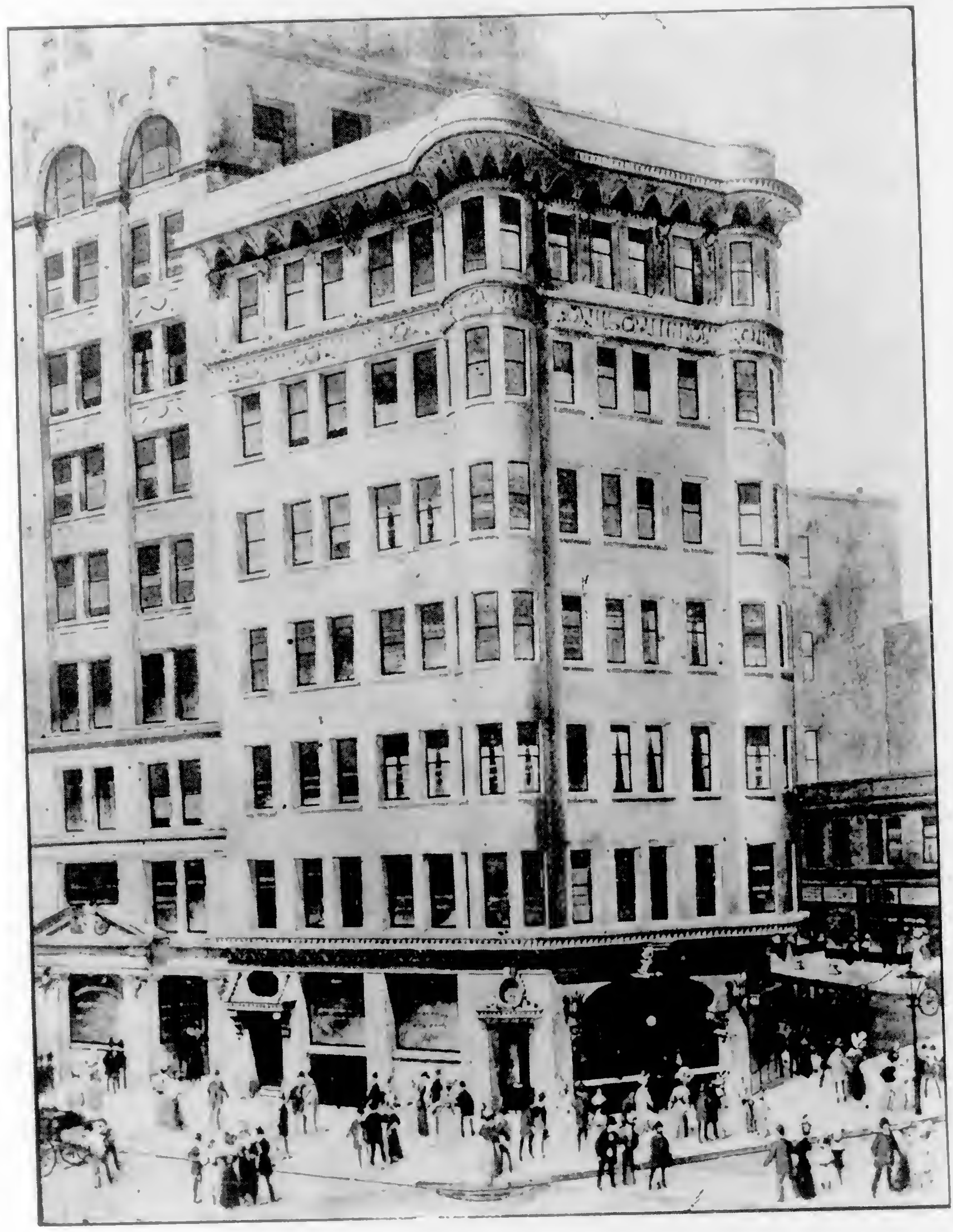
Julius E. Krafft, Architect



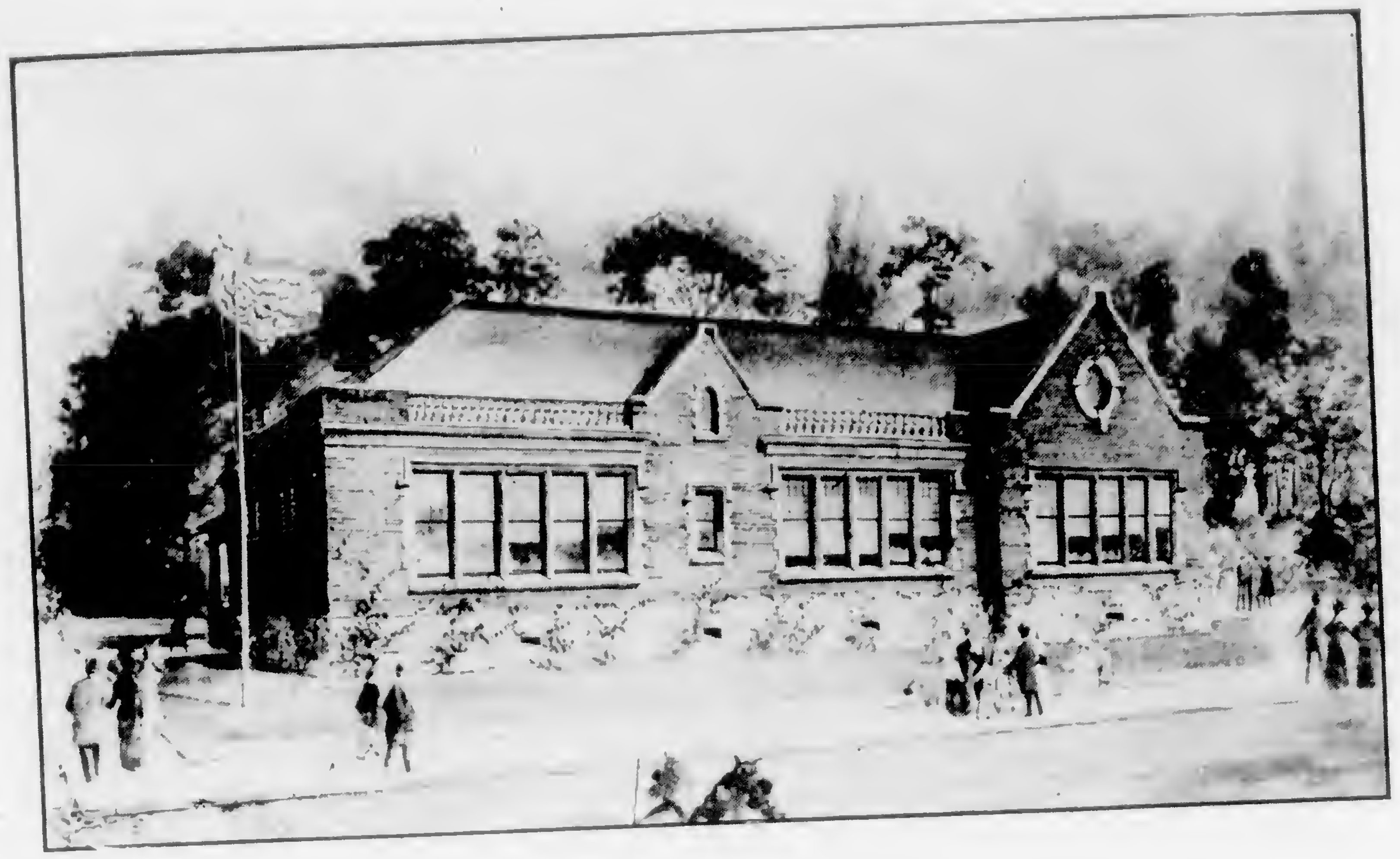
Steel Cage of Whittell Building, Geary Street, San Francisco
Frank T. Shea, Architect



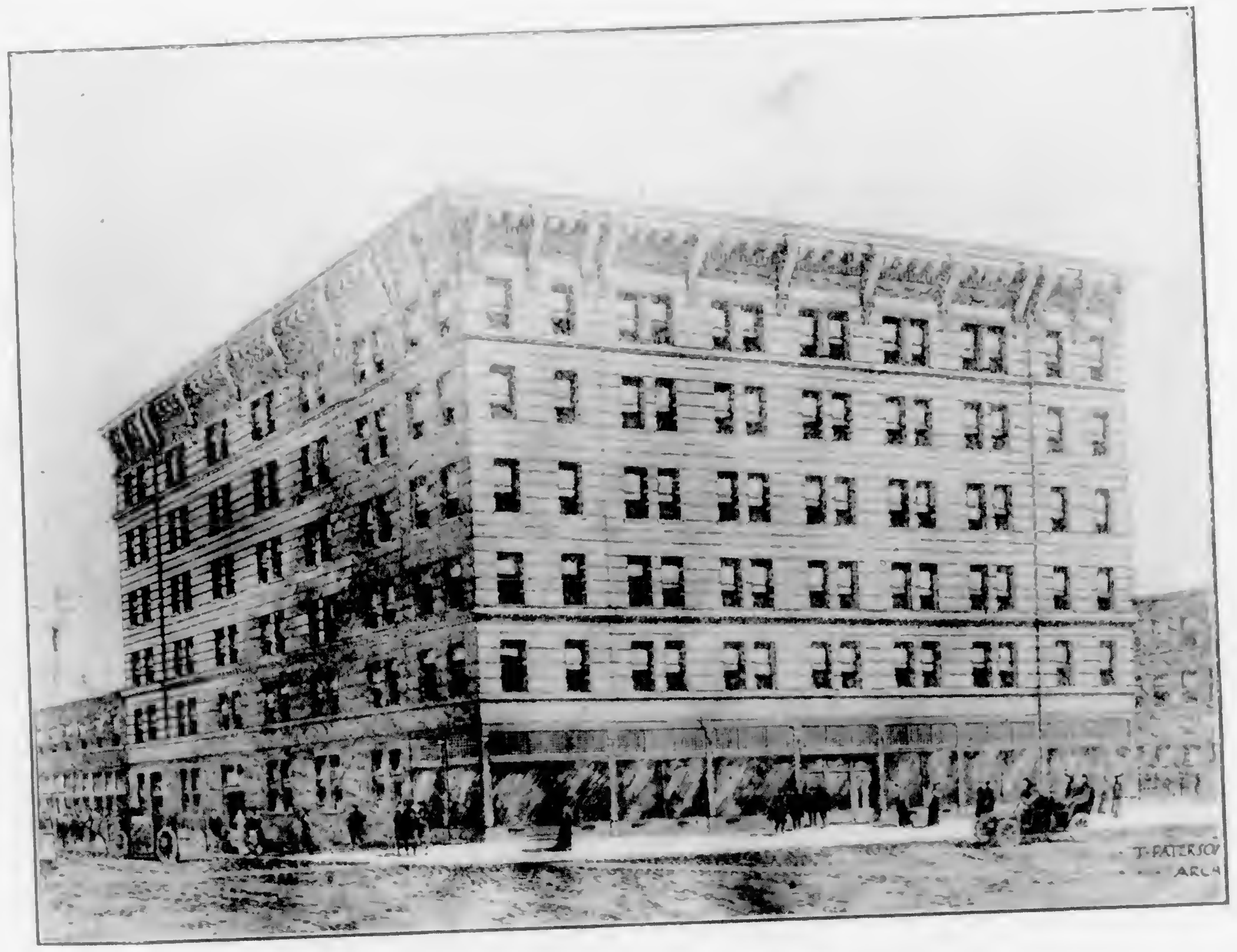
The Whittell Building as it Will Appear When Completed
Frank T. Shea, Architect



The Flannery Building, Market and Kearny Streets, San Francisco, the First Reinforced Concrete Office Building to be Erected in the Burned District
Stone & Smith, Architects



Design for School at Modesto
Stone & Smith, Architects



Zellerbach Building Now Under Construction, San Francisco
Ross & Burgen, Architects

Fire Remedies Suggested by Expert

THE conditions existing at the time of and governing the progress made by the San Francisco conflagration are ably presented in the report of the committee on fire prevention of the National Board of Fire Underwriters. This report is the result of the investigations by Albert Reed, consulting engineer to the committee, who was sent out to make an investigation immediately after the fire. Mr. Reed gives valuable data concerning existing conditions and regarding the effect of the earthquake. He says:

"On the solid ground the action was confined to shaking, in which the upper parts of structures were apt to experience a maximum oscillation. In soft ground there were permanent displacements which resulted in a distortion of the lower parts of structures where foundations did not go through to solid ground.

"This is illustrated by the cases of the Aetna building, the postoffice and the car tracts at the foot of Market street, all of which were on foundations going through the few feet of soft materials. They show but slight change of level, although the streets adjacent have sunk away. The damage from shaking was seldom ruinous, except in topheavy structures, whereas that from displacement was generally structurally destructive.

"The actual damage, though appalling to those who experienced the shock, was not as a general rule structurally serious so far as appearance went. Apart from buildings having ponderous architectural attachments, particularly the City Hall where the damage was great and spectacular, the apparent structural injury was mainly to tall chimneys, church towers and unbraced brick gables, copings and projections.

"The effect on fireproof buildings was especially important, as the steel frame type had never before been seriously tested in an earthquake. It may be said, generally speaking, that these buildings had no apparent structural injury. The steel frames appeared plumb and true, and, contrary to the early account, neither the sides nor the doors had dropped out."

Mr. Reed, as the result of his investigation, reaches the following conclusions:

The most notable facts of this conflagration are not so much the confirmation afforded to generally accepted views, as the light thrown on debated matters connected with fire protection. Among previously accepted views which were confirmed are the following:

The paralyzing effect of a number of simultaneous fires.

The weakening of the fire-fighting force as it thins out over a wide front.

The impossibility, with existing methods, of front resistance to the sweep when the wind velocity exceeds a certain critical figure.

The special vulnerability of leeward up-slopes.

The futility of explosives, except where there is close co-operation with hose streams.

The structural ruin in conflagration of all wooden-joist brick buildings where the stability of the walls in any way depends upon the bracing by the beams.

The limited utility in a conflagration of rear and side shuttering where front windows remained unprotected.

The structural survival, even without window protection and when abandoned, of steel frame buildings with fireproof floor arches, provided the

steel frame is properly incased with fire-proof material, the structural damage being in close proportion to the excellence of the frame protection.

The most notable facts in respect to the light thrown upon debated matters are as follows:

First—The case of the Bush street Telephone Exchange, which had a high type of window protection, but was full of combustible contents, was shut up tight and abandoned and the window protection resisted successfully the general sweep of the conflagration; but some unascertained leak admitted the spark which originated an interior fire, causing as complete interior destruction as if there had been no window protection at all.

Second—The partial success of the South Mission Telephone Exchange, a window protected, fireproof building, in a frame district. This building was abandoned and yet survived with two floors in habitable condition and a large part of the switchboard equipment intact.

Third— The saving of the Kohl building, a steel frame office building, with reinforced concrete floors, and with metal covered trim and cement floors throughout. This was noteworthy as the first conflagration experience of this type of interior and window trim.

The characteristic feature of a conflagration is the direct attack from flame and heated gases. Nevertheless, there are places, and especially in a region of fireproof buildings, where a prevalent cause of ignition is not this general drift so much as it is sparks and brands which lodge on window sills and ignite the sash frames.

The prominent cases of successful defense of unprotected windows were the Mint and the Custom House, the first with 150 men at times and thirty windows on a side. Furthermore, both were only three-story buildings, below the drift of flame and heated gases and in addition were mainly of fireproof construction. The building whose window trim is slowly combustible has, therefore, an appreciable advantage, even with ordinary plate glass and no shutters.

Going higher in the scale of window protection, there is the case of the Western Electric Company, with its wire glass windows. These still can not be regarded as standard, inasmuch as the defect well known to fire protection engineers, namely, diathermanency, developed the anticipated effects, namely, ignition through the glass.

It was the retardent, though not positively resistant effect of the wire glass and metal frame window protection which gave the small force of two or three men a chance to take care of fifty or sixty windows and extinguish ignition fires in detail. The independent water supply also left a small residuum for buckets, which was the essential.

Had this plant not made the very natural and perhaps excusable deviation from strict factory standard in having an electric instead of a steam underwriters' pump, it might have afforded the missing data to the ability of such an equipment to resist a conflagration.

* * *

A great concrete arch will be put in by the Southern Pacific Railroad at Tunnel No 6 on the Shasta Route, near Redding, California, which caved in and forced the company to build a temporary track around it. The arch will extend the entire length of the tunnel and will take at least six weeks to complete. The Southern Pacific Railroad is now one of the largest users of concrete in the West, and several hundred thousand barrels of cement are purchased annually for use on the Pacific Coast.

Mission of San Luis Rey

To Restore Mission San Luis Rey

THE old mission, San Luis Rey, located near the Mexican line, far from the beaten track of civilization, is to be restored on a more extensive scale than any similar establishment in the historic chain that extends along the California coast. The Rev. Joseph J. O'Keefe, O. F. M.; the pioneer Franciscan and one of the best known priests in California, is in charge of the work, and his plans for the preservation and improvement, when carried to completion, will undoubtedly cause the picturesque structure to rank high as a place of interest and charm.

The scope of the project is elaborate and includes the erection of a group of buildings which will form a great quadrangle. In this quadrangle the stately church, which has survived the wreck of what was once the lordliest institution in California, will form the eastern side. The western side will be 173 feet long, and the buildings on the southern and northern sides of the patio will correspond to each other. The latter structure is already nearing completion. It is 186 feet long and two stories in height. This edifice will be used as a monastery, and contains forty-five rooms, neatly plastered and well lighted. The floor of this and the other new buildings on the quadrangle will be of cement, the second story having wooden flooring. All the walls will be of adobe.

In his plans for the future, as in the work that has thus far been accomplished, Father O'Keefe is his own architect and builder. Two Franciscan lay brothers and several Mexican laborers form a small corps of assistants.

Mission San Luis Rey is in San Diego County, ninety miles south of Los Angeles. The greater part of the journey must be made via the Santa Fe Railway to Oceanside, and the remaining five miles traversed in carriage or wagon over an undulating country road. The venerable church, which has so bravely withstood the ravages of time and the elements, rears its scarred walls to the sunny sky in the midst of a picturesque valley. And here in the old days dwelt 5000 Indians.

No other mission in the whole length and breadth of California could boast of greater wealth or more romantic history than this which was dedicated to San Luis, Rey de Francia, or St. Luis, King of France. It was the eighteenth mission in the chain and constituted the connecting link between San Diego and San Juan Capistrano. It dates back 109 years, although the site was discovered ten years before that time by the first land expedition under the leadership of Governor Portola and the sainted Padre Junipero Serra.

The Education of the Public in Architecture

By JOHN BELCHER, A. R. A.

President R. I. B. A., President Seventh International Congress of Architects, London, 1906.

THE first step, as so often is the case, will be for the public to unlearn much that has been wrongly learnt. The superstitions of antiquity and the "styles" must be exploded. It must be made plain that neither a smattering of archaeology nor a superficial study of styles affords a sound basis for a critical judgment in matters of present-day architecture, which must be presented to the eyes and ears of men as a living art, founded upon past achievements, it is true, but instinct with a power and vitality of its own.

Neither is architecture merely a matter of a beautiful exterior; the importance of the "plan" of a building and of sound principles of construction must be pressed home. In other words, architecture is a science as well as an art, a blending of the two in such a way that the practical knowledge of the builder or engineer is inter-penetrated by the artistic spirit, and made without prejudice or loss to subserve its ideas.

Instruction of a positive order will range itself under the three heads of Principles, Qualities, and Factors.

The principles of architecture are two, truth and beauty.

Truth requires that a building, both in its entirety and in its several parts, should never seem to be other than it really is.

This excludes all pretence of antiquity where no such claim exists.

It requires that a church should look like a church, a town-hall like a town-hall, and a private residence like a private residence.

An external shell of plaster over brick must not present the appearance of blocks of stone, nor a steel structure cased in terra cotta suggest solid masonry.

Good architecture never deceives the eye for even a moment. There must be no false suggestion as to the purpose or construction of the building, nor any hiding under one external feature that which is usually expressed by another.

The principle of truth, however, finds its widest scope in the true use of materials.

Every material has essential characteristics of its own, and therefore a proper place and purpose in building. There is a time and a use for stone and for each kind of stone, for wood and for each kind of wood, and so on.

To defy, neglect, or misuse the natural qualities of materials is not good architecture. These natural qualities will be roughly indicated under the head of Factors.

Beauty is the second great architectural principle. Its elements do not admit of popular exposition, but the public may be trained to recognize its presence by the appeal that it makes to their imagination and emotions. The fact that beauty can be felt, but not (ordinarily) analyzed, is of importance in the education of the public, as tending to withdraw their attention from mechanical rules to the spirit that animates and pervades, like a living thing, the highest architecture.

An appreciation of beauty of form is less common than susceptibility to color effects, and needs training and development.

The qualities that distinguish good work from bad may be classed as follows:

Strength—It is not sufficient that a building be, in fact, strong and secure; it must look so; it must satisfy the eye.

The engineer may by exact mathematical calculation know that the conditions and security are amply fulfilled, but the architect has to see to it that the work presents an appearance of strength and solidity. The larger and heavier parts must be below; every arch must have sufficient abutment or even a tie-rod as well; solids when placed over voids must be strongly supported, and so on.

Methods of support and resistance must be clear and well defined.

Granite in the upper story of a half-timbered house may, as a matter of fact, be quite safe, but it seems to threaten danger; placed below, it satisfies the eye with its impression of solidity.

Vitality—Evidence of life and growth, most plainly illustrated in Gothic work, where the perpendicular lines rising heavenward and clothed (as it were) with luxuriant ornament suggests the life of a tree or plant.

It is vitality that gives fresh combinations and effects from the same primary elements.

Restraint—The limitation of means to an end, the suppression of all unnecessary parts or details.

Whatever be the nature of the building, there should be purpose, definite purpose, in every feature or ornament.

This may be illustrated under the head of Proportional Divisions (see Factors); but the general principle is one which will be readily grasped by the intelligent layman, to whom it will often suggest a line for thought and inquiry.

Refinement is impossible without restraint, but it includes also purity of form and perfection of material.

Everything must not only be the best of its kind, but so suited to its purpose that nature will seem to have expressly designed it for that use and place.

The fitness of certain materials and forms for defined purposes and effects is subject-matter for an important chapter in the éducation of the public.

Repose—Every really good work is clothed, as it were, in an atmosphere of repose. There is sense of power, but it is latent power; there is evidence of vitality, but it is restrained vitality.

Effects too pronounced hurt the eye; ornament too profuse wearies both the eye and the emotions. There must be no "loud" or vulgar elements.

Grace—A dignified seriousness of purpose should be observed in the appearance of all public buildings, but an expression of the graceful courtesies of life should not be lacking. In domestic buildings the element of grace takes a more prominent place, and assumes a higher and more refined form, corresponding to the tender sentiments of home life.

The public interest ought to be readily roused in this direction, and a demand created for a better class of small suburban residence.

Breadth—The treatment of the subject as a whole in a simple, grand manner, the proper massing of the several parts, the subordination of detail to the larger forms of the composition and to the bringing of the whole design into unity.

An attempt may be made by illustration and comparison to explain this somewhat technical term, that the public generally may be led to understand and appreciate this quality of breadth which is so conspicuous in every great architectural work.

Residence of Mr. Alfred L. Glassell, Los Angeles
Charles F. Whittlesey, Architect

Scale—The right relation of the several parts to one another and to the whole in point of size.

It will be pointed out that there are different scales in architecture as in music, and that the varying effects upon the mind and heart are as powerful and distinct in the one case as in the other.

Also that the scale should be appropriate to the character and purpose of the building. A building of a monumental character or of great public importance should be designed and built on a large scale, and each part and every moulding should be of a proportionate size.

Factors—In dealing with factors—the means which the architect has to his hand, as it were, for the attainment of his ends—it will be necessary to emphasize the fact that most, if not all, of these factors have their origin in utility, and answer some practical need in the construction or preservation of the building.

To forget this primary purpose and use them as means of artistic embellishment is to sacrifice use and convenience to artistic ideals, and is not true architecture.

The public are quick to recognize the importance of this in respect of window and door openings, floor divisions, chimneys, etc., but are apt to think of columns, pilasters, sills, hood-mouldings, cornices, and perhaps even buttresses, as decorative rather than useful, and to suppose that the architect has a free hand in the disposition of them. Education in this matter will include instruction in the primary use of purpose of the common architectural forms, and will give an insight into the difficulty of making these forms serve the ends of use and beauty at one and the same time.

Such an insight—like propounding a problem—will go far to quicken interest.

The subject may be dealt with under the four heads of Proportion, Light and Shade, Solids and Voids, Balance and Symmetry.

Proportion—Certain proportions are pleasing to the eye, and effects of proportion are obtained by the relative size and different parts.

The various ways in which the constructional parts and features of a building may be utilized to obtain proportional divisions, both horizontal and perpendicular, might be described in detail.

Light and Shade—The advantage that may be taken of effects of light and shade might also be pointed out.

Solids and Voids—The importance of a right adjustment of solids and voids, both in respect of size and position, would come next.

How easily a false scale may be set up, and a building made to look insignificant, by broad sheets of plate glass in the windows!

Balance and Symmetry—These give a very distinctive character to a building, and aid in setting forth its special purpose. There is or can be rhythm in architecture, as in verse.

Material—The right use of the various kinds of material furnishes an interesting and useful subject for public instruction.

The general principle having been laid down that every kind of material has its special characteristics, and should be treated accordingly—in other words that its very best should be got out of it—a brief account of the natural qualities of the chief building materials (stone, wood, metal, brick, plaster, etc.) would follow.

The following leading thoughts are appended by way of illustration:

When stone and brick are used in conjunction the former should be accorded the most honorable parts—e.g.: quoins, architraves to doors and windows, sills, cornices, etc.

Granite, even if it could be carved for mouldings, should be used rather for strength and solidity than for ornamental features.

When the beauty of marble or wood is in its figure or color, it is best exhibited in the form of slabs or panels; if moulded, the forms should be large.

Stone is granular, wood fibrous: each has its appropriate forms and mouldings, suggested by the natural qualities of the material.

Wrought metal admits of the finer and more delicate forms, metal cast in moulds naturally assuming a more bulbous shape. Both kinds have their appropriate place and effective use.

Well known examples of wrought-iron and cast-iron gates and railings afford interesting illustrations.

The foregoing summary indicates the main lines along which the education of the public in matters architectural should be developed.

Whether in public lectures, or in articles published in book form, illustrations should be abundant.

There are signs of a wave of public interest in architecture which, "taken at the flood," may become permanent and lead to great results.

* * *

Little acts of kindness always come home to roost.

* * *

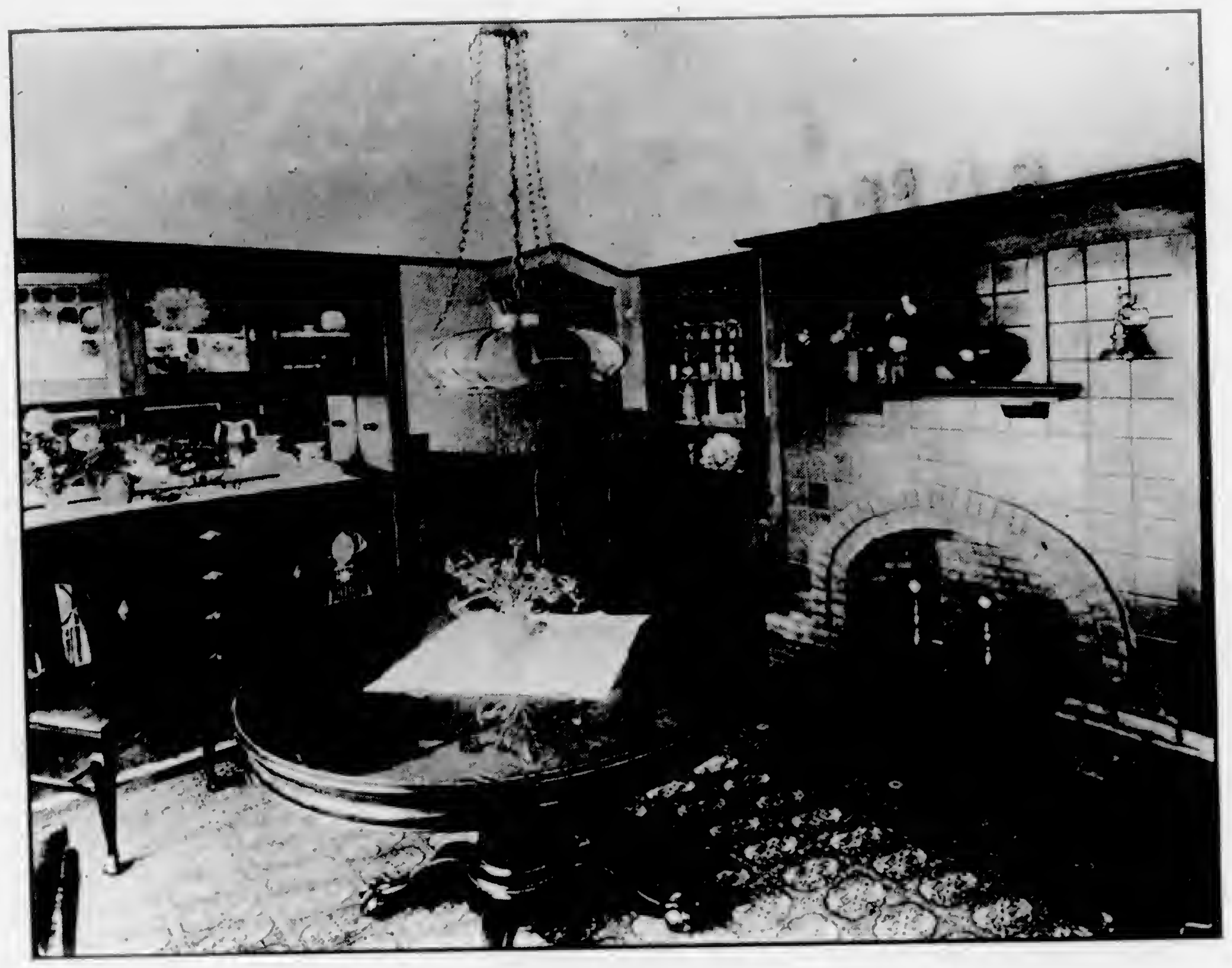
Even the absent-minded man seldom forgets his troubles.

* * *

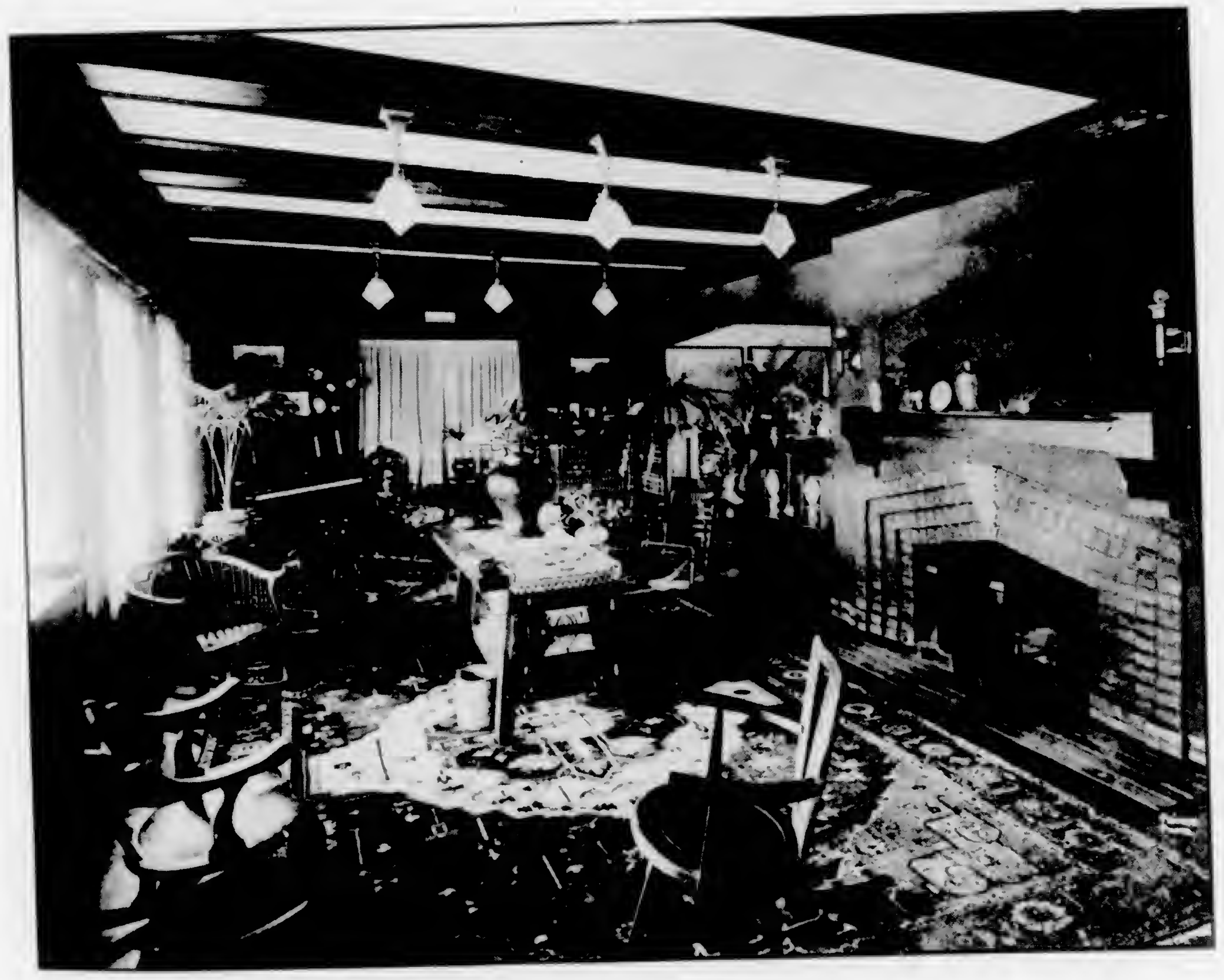
The longer a man aims the more likely he is to miss the target.

* * *

Most men think it is all up with them when they are down.



Dining Room, Residence of Mr. Alfred L. Glassell, Los Angeles
Chas. F. Whittlesey, Architect



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Chas. F. Whittlesey Architect

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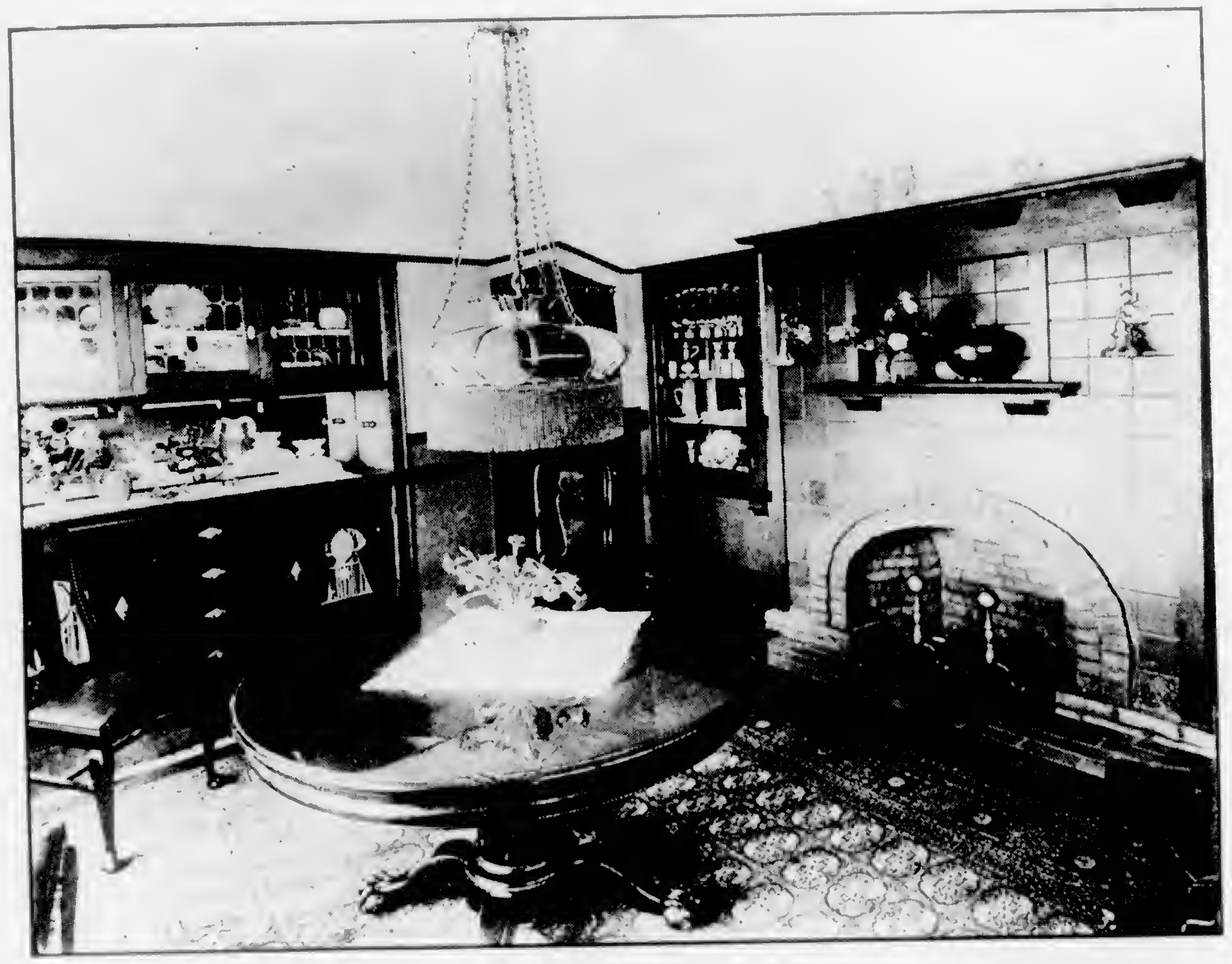

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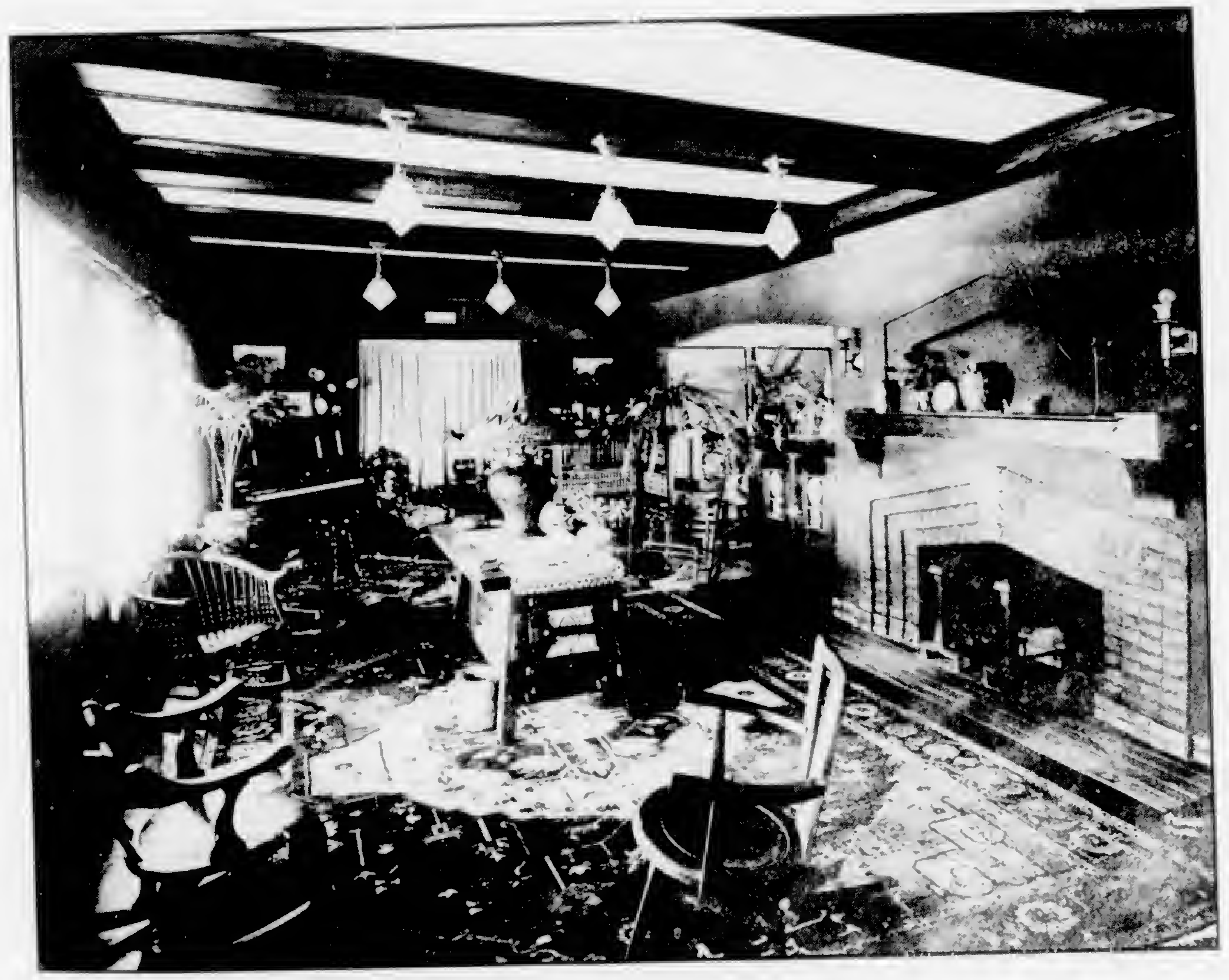

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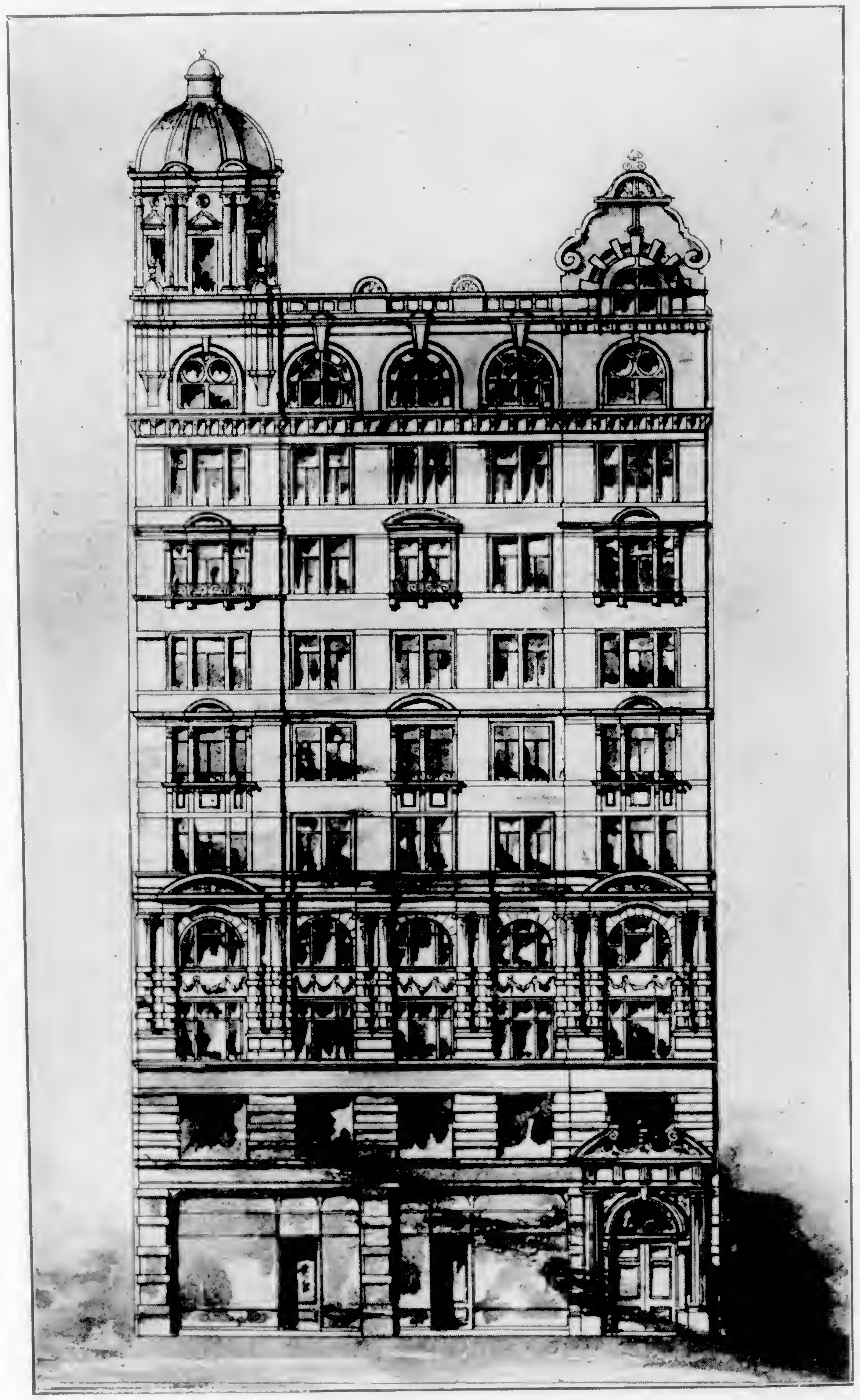


Possible Alternative Treatment of New History Building After Plans by Cunningham & Politeo
A. C. Hope, Architect

A Typical A. W. Smith Bungalow in the Santa Cruz Mountains

American Architecture as Viewed by an English Architect

By A. C. HOPE, Architect.

IN the June number of the Architect and Engineer, you, Mr. Editor, allotted me space for a short article under the above heading. Since then my condemnation of the big crowning cornice has been taken up by the Structural Engineers' Society—not from the aesthetic—but from the purely constructional standpoint.

From whatever the cause, however, imitation is the sincerest form of flattery and I beg to return their compliment, intentional or otherwise, by submitting you a sketch showing a possible alternative treatment of the front elevation, which you illustrated in your June number of the New History Building, as it might be treated by an Englishman.

Instead of docking the cornice altogether as suggested by our friends the engineers, and thereby making the building, metaphorically speaking, like a woman without her hair, it is judiciously distributed over the whole surface (not the hair) with a little ornament on the top to break up the otherwise straight skyline.

* * *

Trying to induce some people to be thankful is a thankless task.

* * *

What a delightful old world this would be if fussy people would only lose their tempers for keeps.

International Savings and Exchange Bank Building, Los Angeles
H. Alban Reeves, Architect

Terra Cotta and Brick

New Uses for Terra Cotta Building Blocks

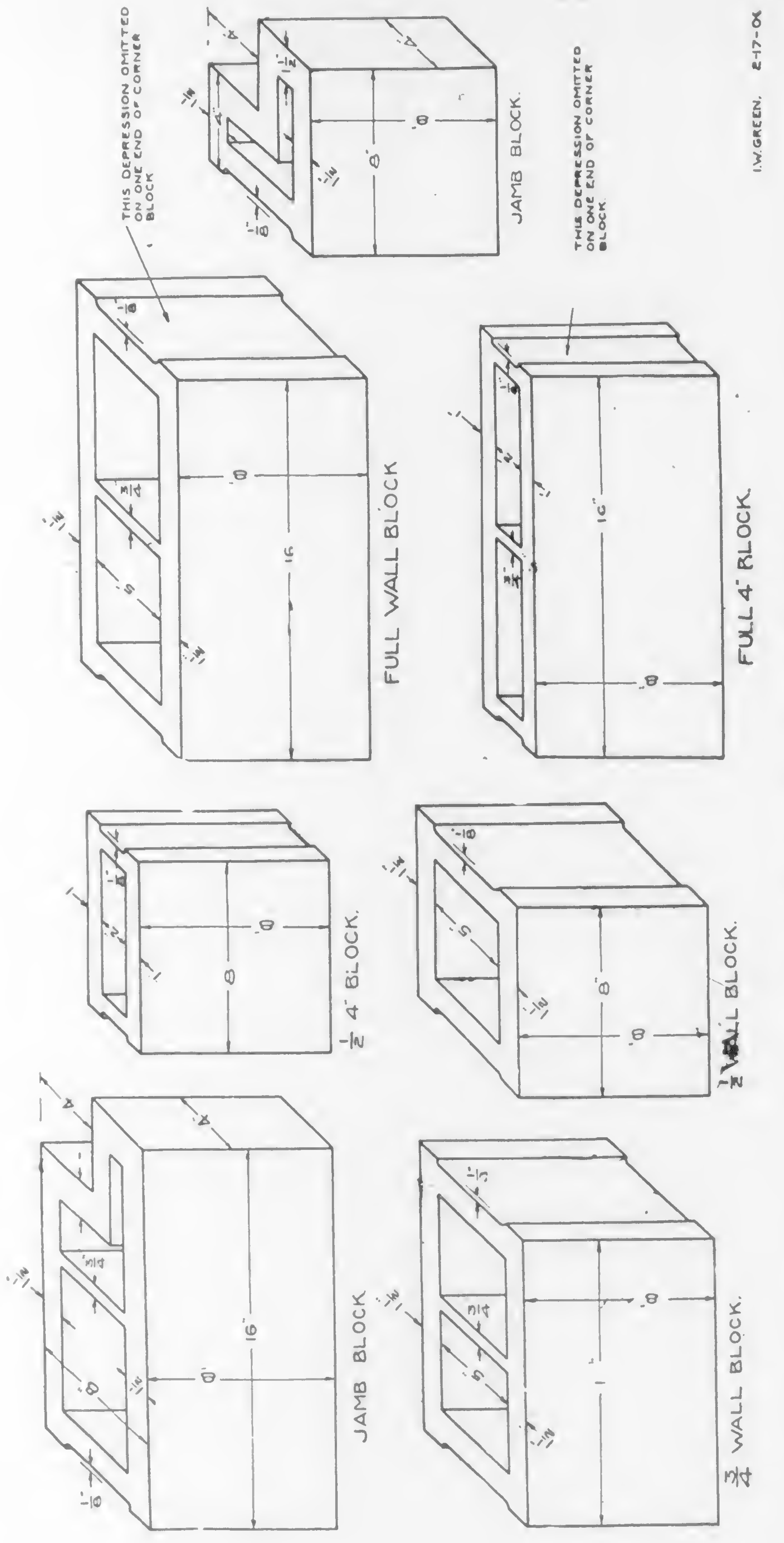
THE construction of a serviceable and artistic detached house of hollow terra cotta building blocks offers few technical problems that cannot be easily overcome; but as the details of the work are not as well understood as those pertaining to wood framing and brick construction, a description of some of the various types of blocks and their uses may prove of value.

Modern terra cotta building blocks possess advantages of great importance over nearly all other building materials. They are absolutely fireproof, resisting temperatures upward of 2500 degrees. They are lighter in weight than either bricks, stone or concrete, and are manufactured in convenient sizes for handling. A 4x8x16-inch block weighs only 20 pounds, and the larger size, 8x8x16, averages 34 pounds. A cubic foot of hollow terra cotta blocks thus averages in weight 40 pounds, while the lightest of cinder concrete weighs 90 pounds, and stone, granite and cement blocks suitable for building purposes much more.

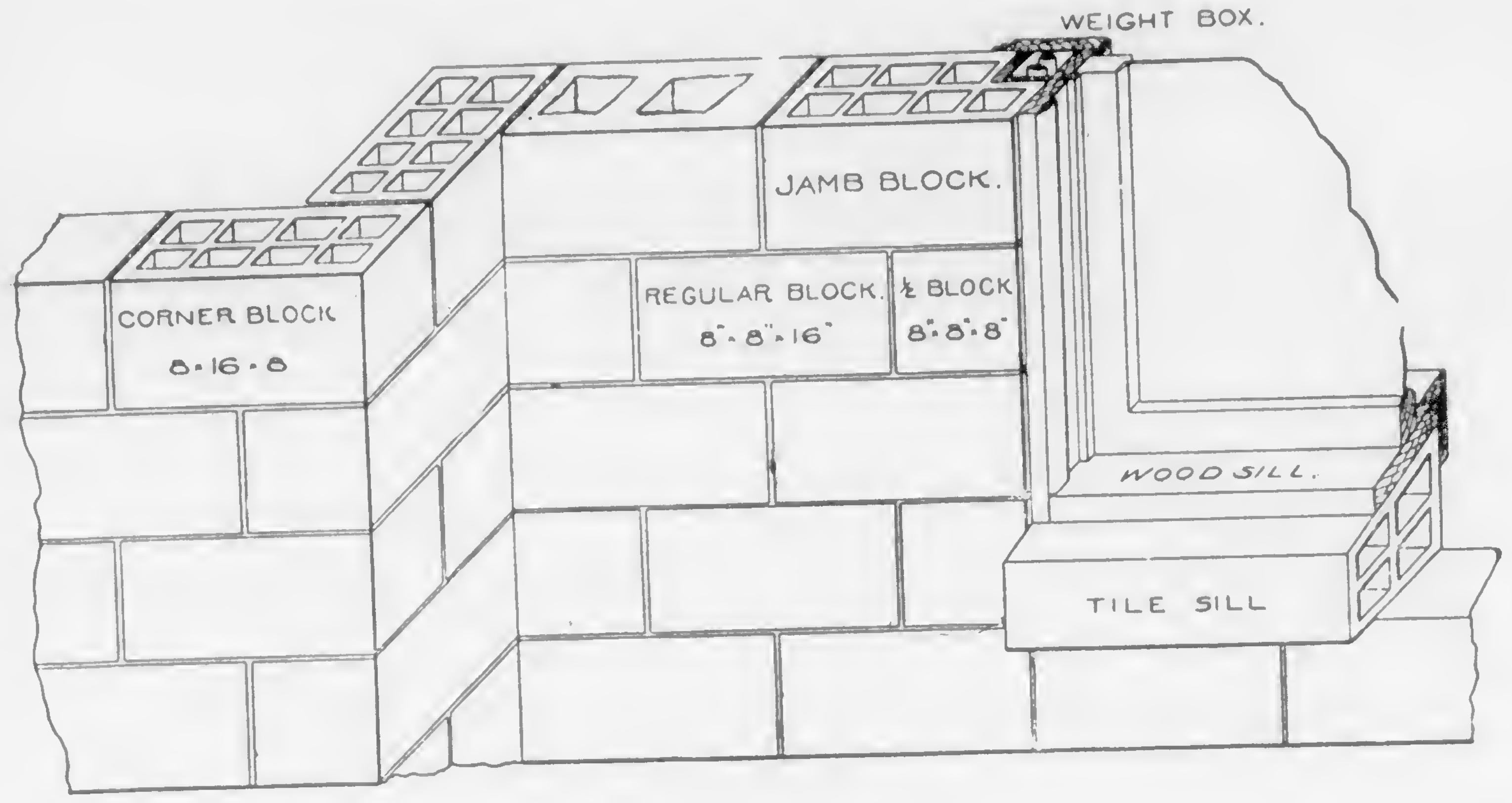
In dealing with any building material the factor of safety is one of the first that architects must consider. Hollow terra cotta blocks are made under severe fire and compression tests, and everyone therefore possesses a uniform standard of strength. Tests made with blocks 8x8x16 inches have developed an ultimate strength of 2500 pounds per square inch in center web blocks and 1969 pounds per square inch on gross area and 6000 pounds per square inch on net area in corner blocks. Thus for all building purposes they surpass in strength any possible compression they could ever be subjected to. A wall built with blocks eight inches thick would prove strong enough for any imaginable work in modern houses.

Durability, warmth and dryness to an unusual degree are obtained from walls of these blocks. They are practically indestructible and, being thoroughly vitrified, are perfect non-conductors of heat and cold and do not absorb moisture. Sound also is deadened by the air spaces in them. Walls constructed of 8-inch blocks thus possess all the desirable qualities demanded—strength, durability, fireproof, sound-proof, warmth and dryness.

The question of cost and economy of construction may appeal to some more strongly than the other qualities enumerated, but first cost, after all, is only a part of the problem. Outside of the question of first cost of material, points of economy in handling and labor must be considered. Owing to their lightness and convenient size they can be laid in a wall at less expense than stone. A single block can be placed in position in one-third the time required to set a stone of similar dimensions. There is likewise a considerable saving in lime, sand and cement, and, as



Various Types of Terra Cotta Building Blocks



ELEVATION OF
8" BUILDING BLOCK WALL.

plaster can be applied direct, lathing and furring are saved. The architect, to deal economically with this material, must have suitable variety and sizes to meet all emergencies.

The manufacturing of building materials at the factory, so that the builder has little more to do than to assemble them on the building site, is a feature of modern constructional work that saves time and delay. The great steel structures are made according to specifications at the mills, and then merely assembled rapidly and securely by the builder. The architect in designing houses of hollow tile blocks merely specifies the size and kind of blocks for each detail, and the work of assembling by the builder is simple and rapid. Wall blocks, water tables, window sills, cornice blocks, band courses, quoins and various other shapes are ready for his use in various sizes. To give variety to the building, rock-faced, tool-faced, plain and imitation stone blocks are at his command as stock material. Ornamental terra cotta made from special drawings and designs is manufactured to suit the needs of any architect. Stairways, lintels and chimneys are assembled with equal ease by means of special shapes designed to meet the requirements of each case.

The method of construction is simple, says The Brickbuilder. A few precautions for the mason should be observed. The blocks should be laid in one part of best Portland cement to five of lime mortar. The sand should be clean, good and sharp and the lime freshly burned. The joints should not exced one-quarter inch in thickness and the blocks should be bonded so that all vertical joints are over each other. Thick or heavy joints in the wall spoil the effect and nothing is gained by them.

In the construction of a house the foundations and basement walls should be built of salt-glazed blocks in preference to others as they withstand moisture better. In the West blocks are manufactured so that the openings can be laid horizontal, but in the East the practice is to have the openings vertical, and the blocks are made with this purpose in view. The greater strength insured in the wall by laying the blocks vertically is sufficient reason why this method will eventually prevail.

The foundations are made of building blocks 8x8x16 inches, laid up in Portland cement mortar and concrete footings, with the length of the blocks forming the thickness of the walls. Rock-faced or tool-faced water-table blocks 10 inches wide, including the 2-inch wash, with a quarter-inch drip, cap the top course of the foundation blocks. The wall blocks, 8 inches thick, 8 inches high and 16 inches long, are laid on the water-table blocks, with quoins and corner blocks projecting. The walls are thus 8 inches thick and the foundations 16 inches, which insures dry cellars and floors.

Wooden floor joists are preferred in many cases to iron, owing to the difference in cost and difficulties experienced in securing structural steel work for a small house. The floor joists are laid on the wall for the first floor and secured in position by special blocks with the inside edges cut half through to accommodate the ends of the joists. These special joist blocks are made in the standard sizes and fractional lengths. The floor joists of the upper story are laid on the walls with the ends meeting the band course blocks which project beyond the building. Inside blocks, 10x4 inches, are bonded to the inside of the band course blocks and meet the joists on either end. The joists thus fit snugly in position and are held there by the blocks, giving a space of 16 inches between centers.

Special jamb blocks, window sills and lintels are manufactured. The jamb blocks have one web cut out to accommodate the jamb. The window sills are 16 inches long, 8 inches high on the inside with slope down to 5 inches. Several shapes are made and their fitting is simple. Special sizes for large windows are easily obtained on order. The window quoins are made plain, rock faced or tooled, and the lintels of doors and windows are formed of special lintel blocks laid up in the ordinary flat arch system.

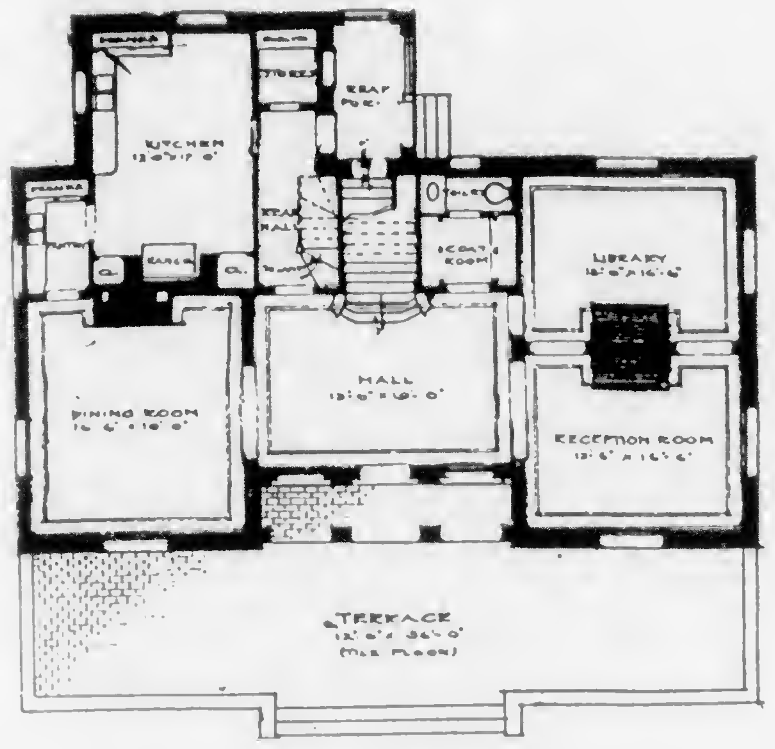
The walls are carried to the cornice in the usual style of stone buildings. Ornamental cornice tiles are fitted to the top course, giving a projection of 5 inches. The cornice tiles are curved, fluted or rounded as desired. The lower part of the blocks fit snugly to the upper course of wall blocks, and this modest projection gives beauty and symmetry to the structure. The roof rafters are laid on the wall blocks in the same manner as the lower floor joists, or they may be used in connection with special cornice blocks with the inside web cut out to make room for the ends.

The framing of the roof is made in the ordinary way and shingled or tiled as desired. If wooden porches are used openings should be left in the walls for the porch beams. The latter rest directly on the walls. By using fractional sizes of blocks these openings can readily be made as desired. These blocks, however, are as easily cut and broken as bricks, and any desired change can be made without difficulty. In every respect they are as simply handled as bricks.

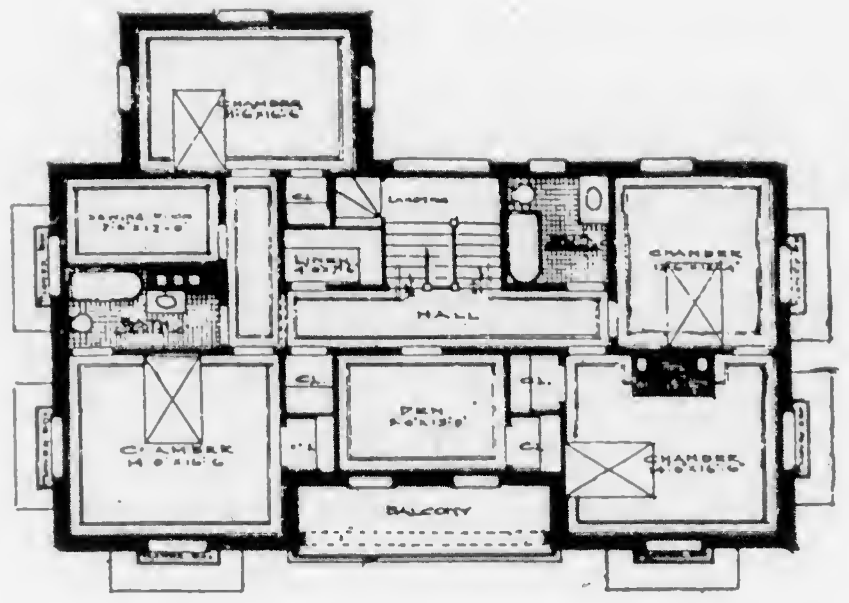
The inside of the blocks are scored to receive the plaster, and no furring is necessary. The outside may be plain, in matched colors or with glazed or tooled surfaces. Where stucco work is desired outside, no matching of colors is necessary.

Chimney blocks are made with air spaces surrounding the flue, which in no way interfere with the draught. A fire starting in a chimney so built could not possibly injure woodwork or even paper which comes in contact with the outside. The total weight of such a chimney is about one-half that of one built of brick, thus requiring lighter foundations and footings. Ornamental chimney caps of terra cotta tiles may be had for finish. These chimney blocks are 14x14 inches, with a space of 8x8 inches for the flue.

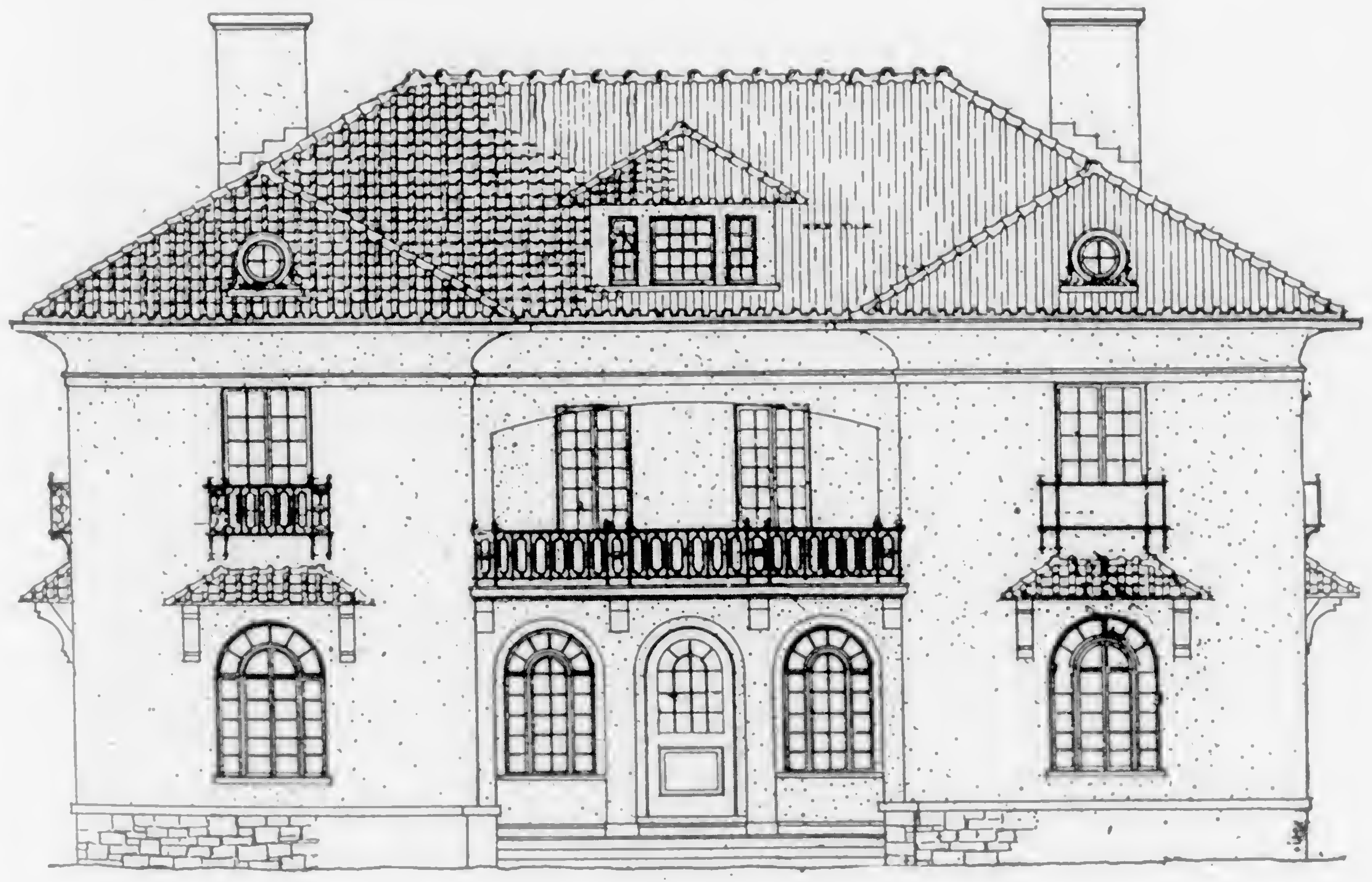
The cost of a simple yet artistic house of this description, built with 8-inch terra cotta walls, 16-inch foundation courses, with wooden porches, floors and wood framing and sheathing for the roofs, would be about



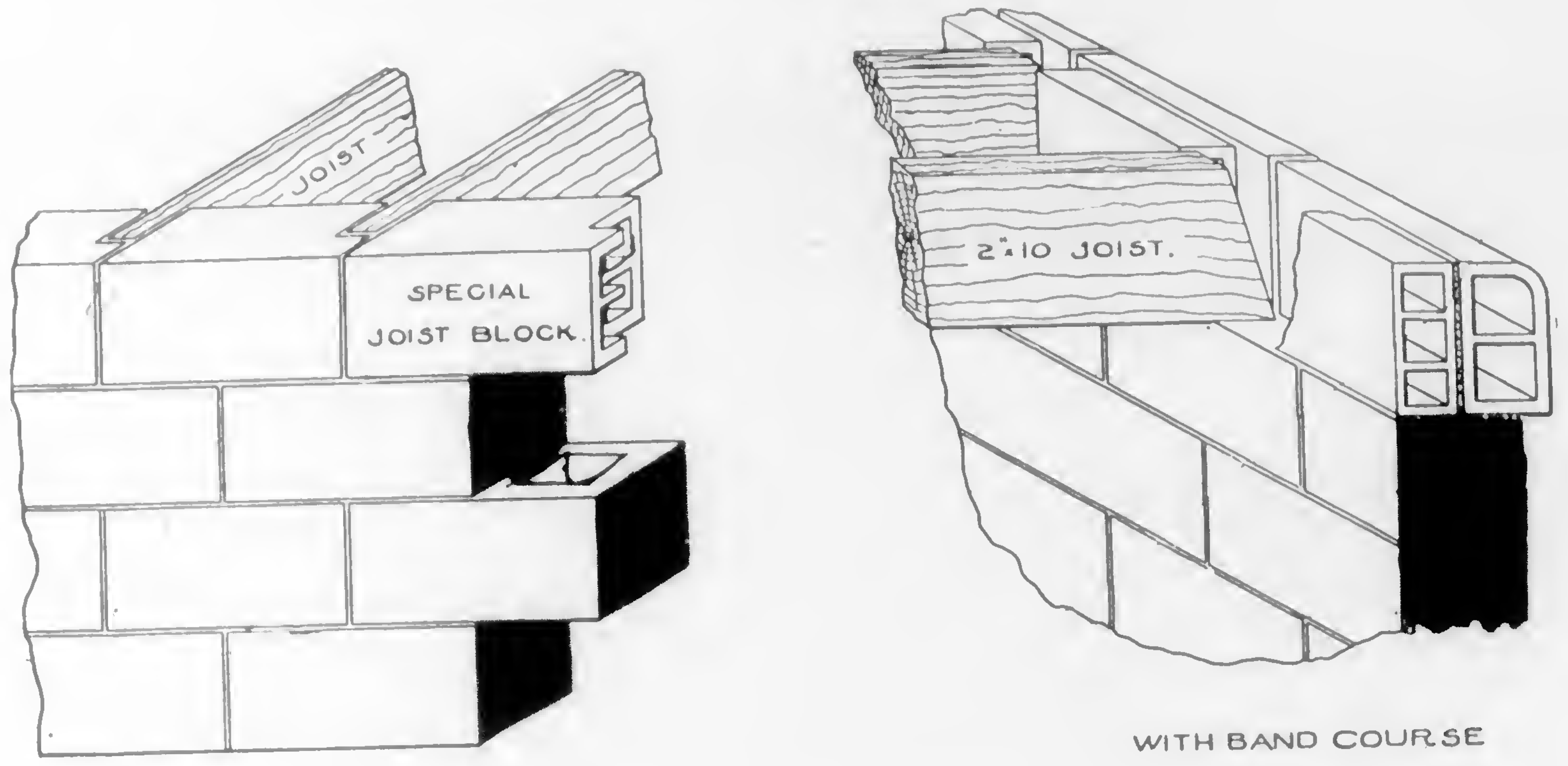
FIRST FLOOR PLAN.
Scale ⅛" = 1'0"



SECOND FLOOR PLAN.
Scale ⅛" = 1'-0"



Design for a House to be Built of Terra Cotta Blocks. Walls Rough Cast
Elliot W. Hazzard, Architect



WITH BAND COURSE

WITHOUT BAND COURSE

METHOD OF SUPPORTING FLOOR JOISTS.

20 cents per cubic foot of total contents; or, if the interior finish and equipment are made less elaborate, the cost may be scaled down to 18 or 19 cents.

A terra cotta hollow tile house, veneered with pressed brick, gives a good finish and provides one of the most substantial houses ever devised.

* * *

Quality of Cement Blocks in Collapsed Building

Architects and builders the country over will be interested in the Government's report on the quality of the cement blocks used in the recently collapsed concrete building at South Framingham, Mass. Tests made from a large number of blocks taken at random from the ruins showed they had a crushing strength of from 63,000 to 130,000 pounds each, according to the size of the block. As further investigation progresses the idea that the cement blocks in themselves were at fault is generally being abandoned, and two probable causes are now assigned, although the official investigation is not at this writing completed. One possible cause is that there was an underlying strata of quicksand beneath the foundations which gave way from the weight of the concrete floors and roof. Another reason assigned is that the steel skeleton frame, which bore a large part ot the load, was figured too light, and with the weight of the concrete roof, much too heavy it is intimated, buckled, tearing down the walls in its fall. Perhaps the full official investigation may disclose other reasons for the collapse, but in the opinions of those qualified to judge it will be found that concrete construction, as such, was in no wise responsible for the wreck which caused the loss of life.

* * *

Men dislike to blame themselves for their own faults, so they blame women for theirs.

Side View of the New Hotel Blenheim

The Hotel Blenheim---A New Type of Construction

THE one thought which should be kept in mind in designing a hotel is that the construction be of a type which meets every requirement and condition of a truly fire-proof building, writes J. Fletcher Street in the Brickbuilder. In the Blenheim, erected at Atlantic City, N. J., the architects have given due consideration to this most vital and important point, and have studied it both in the light of their own experience and by the results of severe and practical tests so recently imposed upon fire-proof and so-called fire-proof structures.

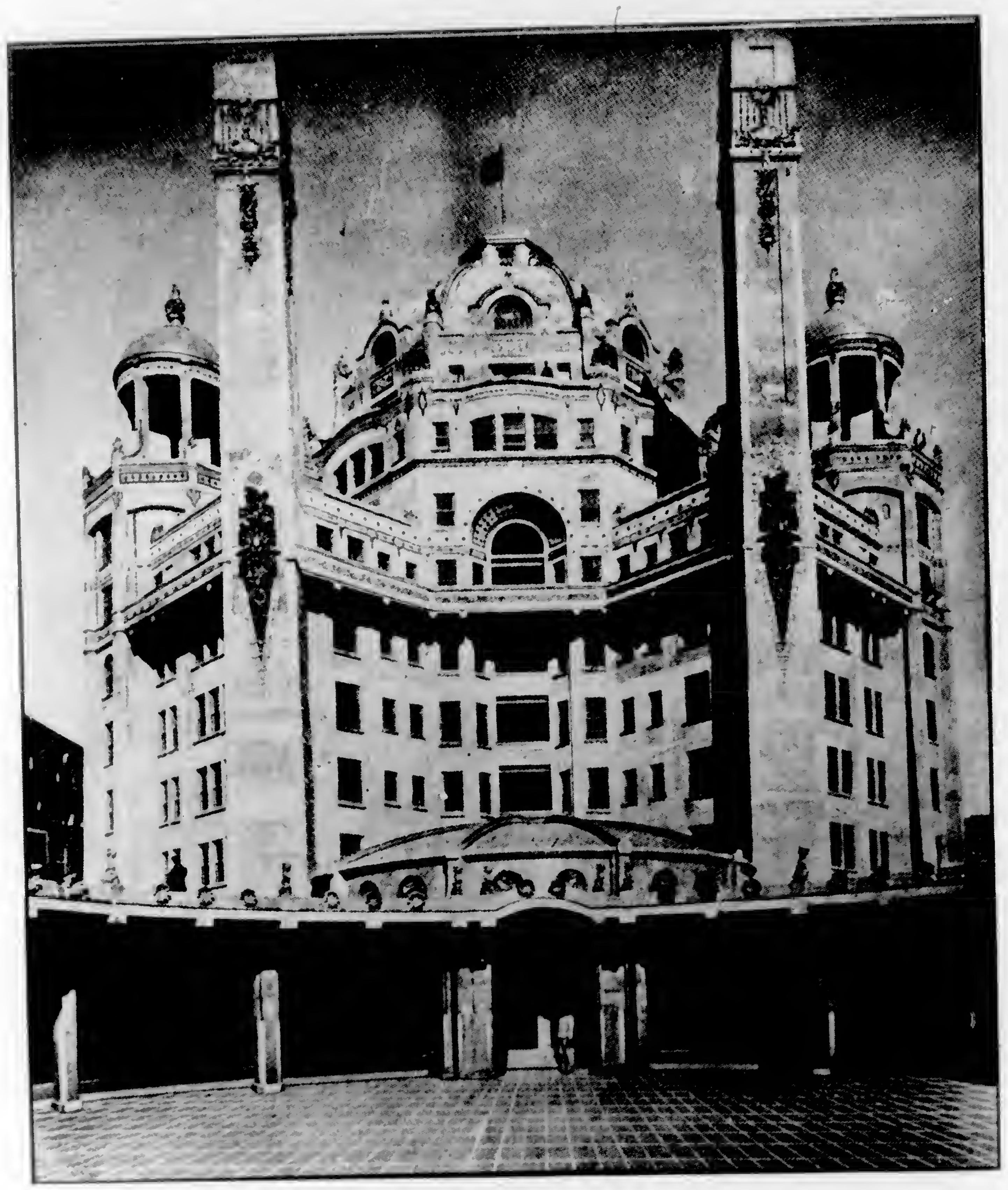
The building is about 600 feet long, 125 feet wide, eight stories high, with a dome equal to twelve stories in height. It was started on June 12, 1905, and was practically completed, ready for finishing and furnishing, on December 1, 1905.

A time limit for the completion of the building having been imposed, it was thought advisable not to take chances with the uncertain conditions of the steel market, as former experiences had shown that much serious delay frequently results from this source. Another and perhaps one of the strongest objections to the use of structural steel was the noise that would result in the assembling of members and in the driving of rivets. As this would be a disturbing element to the guest of the Marlborough, an adjacent hotel and one under the same management, a construction thoroughly practical, and yet one that could be carried forward with the least possible delay and in the quietest manner, needed to be decided upon.

Estimates were obtained for steel, fire-proofed with hollow tile, and an armored concrete and tile construction. Not only was the latter system cheaper, but it was the only type which could be guaranteed, under a heavy penalty, to be completed within the specified time.

The contract price for the clay tile and concrete construction—the one adopted—was $126,000, while the lowest bid for the steel and tile construction was $220,000. The steel necessary for the latter constructon could not have been had under four months, whereas work was immediately begun with the system adopted and carried on at the rate of about a floor per week.

The significant feature of the construction is the introduction of hollow tile in combination with the concrete floor slab. The exterior walls are built entirely of hollow tile, the floors being of long span hollow tile construction,



The New Hotel Blenheim, Atlantic City, N. J. Price & McLanahan, Architects

reinforced with steel bars, and reinforced columns and girders of concrete. Twelve-inch terra cotta tiles, varying in depth according to span, were placed between the lines of concrete joists, which had a uniform width of four inches.

Besides greatly lightening the construction, this system has the advantage of giving a dryer floor and one more nearly sound-proof. But the remarkable distinction is realized in the shorter time occupied in erection over that consumed by any system where a solid concrete slab is used.

The structure in itself is virtually monolithic. With a foundation of piles it rises from floor to floor by means of solid concrete piers regularly diminishing in size as they ascend. Into these are framed the necessary girders and beams for supporting floor joists and outside walls. All walls are curtain walls and are carried at each floor level by their respective girders. This gives the great advantage of permitting work to be advanced at any number of story levels at the same time.

The building as an architectural achievement is most interesting, the design being influenced somewhat by ancient types of Spanish and Mexican work. In the treatment of the exterior the true character of the construction has been frankly confessed. The walls are coated with a gray cement, the dullness of which is relieved by a liberal use of colored tiles in friezes, spandrels and panels. The designs are simple and almost entirely geometric in character, and in only a few instances has the desired effect been sought in a pictorial way.

Cement and Concrete

Concrete Finish---Veneer Anchorage

By WM. B. GESTER, C. E.

THE confidence in Portland cement concrete as a building material, has become firmly established throughout the world. The increase in its use, is so marked, as to have become subject matter for special comment, not only in technical publications, but in newspapers and magazines of the ordinary general type. It has ceased to be a wonder, and its status is accepted now, even by those who, for not very good business reasons, long fought bitterly, and frequently most unfairly against its inevitable growth in favor and use.

The discovery that changes in temperature have approximately identical effects as regards expansion and contraction upon concrete and steel, should be considered as of almost equal value with the discovery of the modern processes of steel making. It has rendered possible a kind of construction, which, although only in its infancy and not generally well understood by the mass of builders, and sufficiently understood by only a few, has nevertheless become forced into prominence by reason of its own wonderful inherent qualities of strength and economy.

As a knowledge of sound ferro-concrete construction methods becomes known, and when the results of experience with the various "systems" now in use, have enabled engineers to formulate a reliable general codification of the laws governing the use of the double material, we shall undoubtedly see this use still further increase.

As it is, however, hundreds of buildings are being planned, and constructed, either of straight reinforced concrete, or with steel frames and ferro-concrete walls. San Francisco is to have her full share of these classes of work.

The ordinary concrete such as must be used to form the body of the walls, does not possess a very beautiful surface. It is unfit to serve as facing for any building possessing architectural pretension, and recourse must be had to veneer of brick or stone, or a surfacing of plaster, or a facing of extra fine concrete must be laid up at the same time, and become incorporated with the ordinary concrete of the body of the wall, and finished by hand after the removal of the forms.

Some work of the latter kind has been done in the East and in Europe. It is much more available for plain surfaces than for architectural ornament. The expense of accurately cutting the latter, even in comparatively soft material from the scaffold, is excessive. Extreme care also is required in placing and ramming the two bodies of concrete together in the forms, and this undoubtedly complicates an operation which because of the necessity for continuous work until completion, is already sufficiently delicate and difficult.

The brick or terra cotta or stone veneer and trim, may be so bonded and anchored that they will remain in place in spite of even such severe conditions as obtained during our April quaking, and they do fill architectural requirements.

There is no doubt that architects will specify a stronger anchorage than they ever have done before, and there is no doubt of the wisdom of so doing. An example of thoroughly safe practice in this regard, may be seen in the type of anchor, specified by the architects, and used in tying to the backing, the "Roman Stone" facing on the basement walls of the Fairmont Hotel. The stones are unusually large, averaging 36 inches by 18 inches in area, and being 4 inches thick. Each of these blocks is channeled to hold two steel anchors, having a cross section of 1"x½", and to be imbedded 12" into the wall. These are formidable ties, and may to many seem heavier than necessary, but there is no doubt of their sufficiency, and their specification indicates the tendency to secure safe anchorage.

* * *

The Concrete Block Industry of the Future as Indicated by the Past

By A. P. MELTON.

IN all lines of business depending upon or affected by manufacture of concrete blocks, no topic is of greater interest than the probable future of this industry. The manufacturer of machines would like to know the chances for continued activity along his part of the business. The manufacturer of blocks is concerned as to whether he should make up a large stock or make up material as ordered, while the clay-brick man has an excellent reason to worry as to what course he should take. Why should there be any skepticism? Concrete has for years been recognized by, and specified by the foremost engineers and architects for nearly every part of buildings from the concrete footings to the concrete roof. The foundations, the columns, the beams, the floors, the fireproofing, the ornamental work, the roof, the sidewalks around the building, and even the sewers may be made of concrete, and all to be pronounced perfectly successful by experts. Yet in the face of the apparently indisputable evidence as to the quality of concrete, we hear of many who would like to build out of blocks, but are afraid to take the chance, having seen or heard of buildings that were not satisfactory. The manufacturer of blocks often says that the architects and engineers are down on the product and will not specify it. Then we have the manufacturers of rival building materials, who, of course, use any failures, in concrete block construction as examples to show the superiority of their material. Why all this skepticism? Why do we hear that architects and engineers do not favor the block?

Why do manufacturers of rival materials even have a chance to refer to any failures in concrete block construction? Who is to blame for all this? Who are the real enemies of the concrete block? The causes of all the above troubles can be traced to whom? The answer is, First: Some of the manufacturers of block machines, and—Second: Some of the manufacturers of blocks.

About two years ago, when the block began to become prominent, machines of various types were put on the market, some of which, to one who is accustomed to designing machinery of this character, or to one who is familiar with concrete, were entirely impractical through faulty design, proportion, strength and utility. Yet hundreds of these nondescript machines, if they can be called machines, were sold throughout the country. (I have had a good deal of experience in designing machinery of this kind, and always take great interest in the design and proportions of the parts, and am glad to note improvements by many of the progressive manufacturers; also to note that some of the hopeless ones have given it up since the conventions of last year.) But while these poorly constructed machines cannot turn out a perfect product, and consequently any building put up from these blocks will hurt the business, more or less, the injury is not necessarily lasting, as, if the blocks are hard and sound, it is easy to show that the fault is only in the workmanship.

The greatest evils we have to contend with are the results of mistakes that have been made, and false impressions due to these mistakes. For instance: When this industry was in its infancy, a great many of the block machine men advocated mixtures as lean as one to ten, and very few talked any richer than one to five. As the business was new most of the buyers of machines followed out the instructions given with their machines as the only guide then to be had, with results disastrous in many cases and unsatisfactory to say the least. Hundreds of houses and thousands of foundations have been built of blocks made from these one to five and one to ten mixtures, and were it not for the redeeming fact that a greater number have been built of properly proportioned concrete, the business would now be in a bad way indeed. As it is we have great odds to work against in introducing the material. Bad reports spread faster than good ones. Another feature of this method of making blocks is the fact that the market price of blocks in many localities has been made too low, and the block men find it necessary to raise their prices if they make and take care of their product properly, a thing easier said than done.

We hear that the engineer and architect are not favorable to blocks. This I do not think is true, except in isolated cases. The future success of the engineer and architect in their respective professions depends upon the reputation which they are able to make and maintain. They have to be conservative in making recommendations, or specifying materials, as the layman looks to them as an authority and spends his money according to their suggestions. An engineer cannot recommend material off hand, but in concrete, especially, must know the proportions and quality of ingredients before he can act. Taking these facts into consideration, and the fact that the makers of some machines advocate poor mixtures and the fact that the blocks are actually made of mixtures varying from one to five to one to ten, at the suggestion of the machine man, there is little wonder that the engineer and architect don't favor or want anything to do with the work. Another fact is that many machines are not complete enough to make the different blocks which an architect would require in a building, making it necessary, of course, for him to use some other material. Another result of this ill-advised policy is the code of building ordinances covering the use of concrete blocks, and limiting them to very small bounds indeed. In concrete blocks actually tested the average crushing strength was sufficient to support a column of blocks over 2000 feet high, yet we have ordinances in different cities limiting the height of block buildings to three stories or less. In view of the fact that the block men have in so many cases been trained to make an inferior product by the very people who should insist on the best, and that it is impossible to inspect all the blocks during the making and curing process, we cannot call such ordinances unjust. Where the proper standard is maintained in concrete blocks there can be no prejudice, and liberal revision of ordinances can easily be procured.

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*Paper read at the Northwest Cement Products Convention, Minneapolis.

This rather lengthy discussion of the demerits of the concrete block is not intended as a wet blanket to the business, for no one is a greater optimist than myself as to the future of this industry, but we who are interested must admit that a bad start has been made by many machine men, in trying to make the thing look too good. We must admit our faults and mistakes and must rectify them if we expect to remain in this business in the future.

I have been collecting data from cement block manufacturers and upon comparison find that the larger plants, employing five or more men, manufacture blocks much more cheaply than those employing only a small force, the cost of labor being almost double in many small plants. These la[illegible]lants go into this work as a business, and have necessary machinery [illegible] quipment, and usually handle other lines of cement work as well. [illegible] ime is coming when the wood-shed block plant will be extinct. It [illegible] go the way of the little road-side clay-brick plants that used to be [illegible] and almost anywhere. The block plant of the future must have more than enough face plates to make a few abominable looking rock-face designs. The block machine companies must be able to furnish many special designs and blocks, and the foreman of the block plant must understand thoroughly what he is about, and be able to devise special molds for many blocks that will be specified.

Any business as important as the building business must have capital behind it, and it must be run on business principles, be large enough to have a regular system of operation, and have a man superintend who understands cement. This has been the history of every industry, the steel, oil, farm, implement, lumber and many other lines have at one time been operated in a small way, but system and concentration of capital and large plants have proved a source of great economy. Hence a few years will see the cement block industry in each community all under one or two heads, instead of a dozen or so wood-shed or basement plants. Another system which will be possible when the business reaches this stage, is that inspection will be possible by a state or other official similar to the pure food, or the scale inspection, and the man who tries to skin on his cement or workmanship will go the way of the man who works his pump over time in connection with the dairy, or the grocer who tampers with his scales.

If an inspection of this character could be enforced there would, no doubt, be a marked change in the quality of the work. If we would all advocate a mixture of not poorer than one to three in the future, we would be making another great step in the progress of the concrete block industry. If we could all have our block actually made of a one-to-three mixture, and properly cured, we would have very little complaint.

We will have these conditions in a very short time, but we must at every chance preach better mixtures, better systems of curing, better equipment, economy in labor and handling materials and a better price for the resulting superior product. Five years from now will see a model plant in every community large enough to support it.

Heating, Lighting and Electrical Work

The Adaptability of Various Art Classifications to Lighting Fixture Designing

By CARL E. ROESCH.

THE conveniences of the present day with which our daily life is surrounded, become so fixed in our minds that we give but little thought to their origin or the various stages through which they have struggled to attain their present degree of usefulness.

This is particularly true of the modern methods of lighting, where the mere pressing of a button or the turning of a key accomplishes for us a result which was at one time only possible through the expenditure of much time and effort, and we are thus relieved of the necessity of dwelling upon the thought as to why and how this should be so.

In a previous article in this magazine, the writer devoted some space to an explanation of the early history of the various kinds of light, the first instances of the use of gas, etc. The purpose of this paper, however, will be to dwell rather upon the origin of the various devices to convey in practical form the different light factors, than to treat of the history of these factors. In this connection it is of interest to quote from an article by G. Alfred Pearce, which appeared in one of the recent technical journals, in which he says in part:

"The first electric lighting fixtures for incandescent lamps were made by William Pearce, Boston, Massachusets, to the order of George Peabody, the great banker and philanthropist. The motif was a free treatment of stalks of Indian corn and running pumpkin vines. Twenty-six lights were set in sockets fashioned like the stems of ears of corn. The bulbs were of moulded glass made to show kernels, and the sockets had leaves of sheet brass, hammered to the likeness of corn husks. The twenty-six lights symbolized the then twenty-six States of the Federal Union. This candelabra was about twelve feet high and was finished in ormolu. The object of its manufacture was to enable George Peabody to use it in his office for the purpose of enlisting capital in floating the electrical lighting inventions of J. W. Starr of Cincinnati, Ohio. The candelabra was afterward taken to London where Michael Faraday saw it and made it the subject of a letter."

From the above one can readily see how the designers grasped at the freedom of line and position of illuminant source, offered by the electric light over gas, which at that time could be placed only in an upright position. This sudden release from the bondage prescribed by the limited artistic possibilities of gas lighting instruments, gave to fixture designing a new impetus which has lead through various degrees of perfection, up to the present high standard of this branch of decorative art, as is exemplified in the lighting of such interesting buildings as the New York Yacht Club, the Astor and Belmont Hotels.

In designing things of a purely ornamental nature, such as jewelry the artist need give no thought to anything but the beauty of line, while a designer of lighting fixtures must keep in mind the very essential one of practicability, both as to construction and utility, and combine therewith originality and beauty. To accomplish this he may work toward either of two ends; the one in which he incorporates the recognized architectural values, or the other in which he employs floral motifs.

The lighting of the new Federal Building in Chicago offers some excellent illustrations of the artistic possibilities of classic design. Perhaps this unusually good result was due to the fact that a competition was held among the designers of the most successful and competent fixture manufacturers in the country.

The ready application of various forms of plant life, at once suggested itself, and was immediately developed, giving rise to the designs executed in "Art Nouveau," where this form reached its highest degree of perfection. The fundamental motif of this school of art appears to be a use of the graceful curves found in vegetation, particularly that of tropical and aquatic origin, and a more or less faithful adherence to nature in the use of these curves rather than their reduction to conventional forms. In Europe, where the idea originated, it has many ardent advocates, but here at home it has never been able to fix itself permanently into our decorative field, even through the efforts of various prominent architects and decorators, who, by occasional revivals, have attempted to graft upon us permanently this style which bases its claim for recognition more upon its originality than its practicability.

It will be seen that the designer's originality of execution will be governed by his versatility in applying the traditional architectural forms and assembling them in artistic mass, or when striving for a florid or festive treatment to employ the more flowing lines made possible by the use of floral or fruit motifs, and by this we do not necessarily mean "Art Nouveau" for the beauty of the various Louis periods in French decoration, or the inspiring dignity of Italian detail is infinitely superior to the excessive ornament usually found in the so-called examples of "new art."

Originality is a most commendable thing, but ornamentation hardly deserves to live on this alone, and when it does not show its purpose clearly and tell a true story, it were better to adhere to the traditional forms where merit has stood the test of ages of criticism, even if it be a slavish adherence to some school or period, for deception or a lie can never be the foundation of true art.

* * *

Possibly the exact origin of "flat," as applied to an apartment, will forever remain in obscurity. In recent years owners of "flat houses" in some cities have rebelled against the term most hotly. A short time ago a tenant was threatened with a suit for libel because he persisted in saying that he lived in such-an-such a flat house. The landlord declared that the structure was neither a flat house nor a tenement, but an apartment house. The repeated use of "flat house" as a designation tended to lower the reputation of the place and drove away would-be occupants. In some cities the word flat, however, carries quite the opposite significance.

The Paint and Painting Question

By H. T. JAMES, Manager of the Bass-Hueter Paint Co.

As a rule too little attention is given to the all important point of painting the interior and exterior of buildings. The architect specifies good material and leaves the balance to the contractor, who frequently endeavors to economize from the very start by using cheap material for the priming coat, or the foundation as it were, which is just as important as a good foundation to the building. Pure material is the beginning, the middle and the end of the right kind of paint; the kind that is safe to use for priming, second and third coating; the kind that preserves and protects, and when the time arrives for the re-painting, leaves your building in the proper condition without the necessity and expense of burning and cleaning off the old material that remains.

Paints made from pure materials are not cheap, but the first cost should not be considered. They do not enter into competition with the cheap kind! There is no common ground. Either a paint is good for building, or it is not. The cost of application is the same in either case, but they differ in this: the first cost of pure paint is more than the adulterated, or poor, but the lasting quality, or result saves the difference many times.

Good paint is sometimes condemned for various reasons, such as using it over poor lumber containing moisture or sap; soot or grease; the using of a cheap priming coat of Ochre, or some non-drying paint; or the using of a priming coat containing linseed oil substitutes.

There is no secret in producing good paints, although there are many formulas, and many materials used in manufacturing the various grades on the market. The manufacturers and producers of pure carbonate of lead claim the base of all paint should be entirely of lead; zinc manufacturers claim the base should be entirely of zinc. As a matter of fact, the best results are obtained by using a base consisting of pure carbonate of lead and the proper percentage of zinc. When this is used in connection with linseed oil, the proper percentage of turpentine and driers satisfactory results will be assured.

In producing color combinations, or tints, only strictly pure colors should be used, and when possible permanent ones. It is false economy to use adulterated colors, or to paint over old material that is peeling, scaling or cracking.

Too little attention is given to re-painting of old work that is in good condition, and does not require burning off. Buildings in this condition need a larger percentage of oil for the priming coat, and where they frequently require three coats, they are given two heavy coats, in order to cover and make a solid finish, in place of giving three thin coats and supplying the worn and dried surfaces with a proper percentage of linseed oil, which is really the life of the paint.

An important point is the matter of puttying, particularly on new work. Few of the contractors use pure putty, and more or less difficulty is continually experienced from the use of adulterated putty.

* * *

Gas from cocoanuts is the latest illuminant. The coal of the Philippines has been found unsuitable for gas making purposes. The government, therefore, has been experimenting in the laboratories, and has found that a gas of great illuminating power may be produced by a very simple method from cocoanut oil.

San Francisco Architectural Club Celebrates Anniversary

By C. E. ROESCH.

TO devise new and original stunts for the celebration of anniversaries is an art which few of us are equal to, but our organization is fortunate in numbering among its members several just such individuals whose resourcefulness and ingenuity brought forth an entertainment on the 29th of September which made the fifth anniversary of the club one of the most delightful events in its history.

The following is the cast of a little travesty on "Work" written by Mr. A. O. Johnson, the "Clyde Fitch" of the Pacific Coast, who successfully injected into his lines bits of local color and "gags" relating to the architectural profession, which were highly appreciated, even by those who were made to suffer thereby, at the hands of our celebrated comedian Mr. C. A. Newbauer. Mr. Newbauer's cleverness in comedy roles, together with his excellent tenor voice, is likely to take him from the drawing board to "treading the boards" (or ties) to whch he is no stranger, having done some little quartette work professionally in the past:

Mr. A. Overton Johnson's travesty on Work entitled: "Skinner Skinned," or, "Three Acts in Thirty Minutes." Cast:

A-dam Skinner........................The Author
A "reinforced commission" Architect
Dr. A-L-L Curer........................Carl E. Roesch.
Mrs. Cox........................Miss Harlae Corwin
Gladys Softleigh, "The Fiancee"........................Miss Charlae Archer
and
A. LAZY TOOTHPICK........................CLARENCE A. NEWBAUER
THE REAL BOSS

Otherwise there will appear tangled up with the play, artists and entertainers of such repute that they need no introduction to you. The invitation has been tendered them to—

"Go ahead and do your worst"

SCENES

Act. I.—The offices of A-dam Skinner. Act. II.—The same.
Act. III.—And still the same.

PROPERTIES
Havens and Toepke "down stairs"

COSTUMES
Our friends and their sisters.

SCENERY: 'Twould be a shame to tell you.

LIGHTS: The candle maker.

Stage Manager, George Wagner.

One must take the degree of appreciation shown by the audience as a criterion of the success of our efforts, and inasmuch as no violence was indulged in, it is fair to assume that the entire cast, individually and collectively, portrayed their various parts as befitted them. Much credit should go to the stage manager, and those who, from similar experience, can form some idea of the degree of work there is involved in bringing to some state of perfection a bunch of raw theatrical material, will bestow ungrudgingly upon Mr. Wagner the reward he so richly deserves.

During the intermissions we were entertained with musical selections, the singing of the Hawaiian airs with stringed accompaniment being especially appreciated, and at the conclusion of the intellectual repast, the "material" man was provided for in the banquet rooms by Monsieur Albin and his able assistants, where tastefully arranged the supper awaited our pleasure.

Again the resourcefulness of the club's membership was in evidence in the conception and execution of our "International" spread, each course being characteristic of some nation, and as the course was served a large phonograph played the national air of that country.

The customary speeches and congratulatory remarks were indulged in, the evening terminating with the usual stories and antidotes permissable at a stag affair. A lingering "goodnight" over the "small black" and cigars, the members dispersing, and another successful year was placed to the credit of the S. F. A. C.

* * *

AT the regular monthly meeting held October third, the customary business as to membership, etc., was gone through with and the reports of the various committees were read and reported upon. When new business was in order announcement was made that the Architect and Engineer proposed to offer another prize competition for a new cover design for their publication, to be awarded along the same lines as the previous competition. This is open to all club members and as there is no special time limit, this should bring forth some interesting results.

The Steel Class, through its secretary, Mr. James McGee, made its presentation of a handsome bookcase to their instructor, Mr. Chas. F. Archer, who in turn, presented it to the club.

Mr. Schmidlin's resignation as secretary was read, to take effect November 7th. Mr. Schmidlin desires to make certain preparations before going on an extended educational trip, and asked to be relieved of the detail of his important office which he has filled so creditably the past year.

Several of the members are preparing a sketch and heading to be used in this publication to head the club department news which will appear each month.

* * *

Do Fashions Follow Architectural Whims?

IN previous ages the dress of a people resembled, to a wonderful extent, the architecture of their time. When the style was along artistic lines in building, the same might be seen in the clothing of the people. —Mrs. B. F. Howard to Chicago Dresamkers' Club.

If in other ages fashions followed architectural whims, isn't it as sure as shootin' that today we dress our limbs in a style originating in the things we daily see? Doesn't this account for fashions—save the ones from gay Paree? Asks a Chicago contemporary.

See this man and his "bay window,"
Ain't our supposition so?
Got it 'way back in the eighties,
When his style was all the go.

See this old, bald-headed party, with the smooth, well rounded dome around you, right at home. Don't it match the big postoffice? See the lads with baggy coats. Where did they get their idea? Why, that's easy. Sailing boats.

Why do men wear two small buttons on the back of a cutaway, useless as a man's appendix vermiformis? Tell us, pray! Isn't it because they copy—rather than invent, instead—modern architecture, which is full of frills and gingerbread?

Talking, now, about ideas,
Here is one you should not shirk:
Wasn't the peek-a-boo suggested
By the open lattice work?

Interior Decoration

New Style Mission Wall Papers

MISSION has undoubtedly arrived. By this we mean to say that, from being a special and peculiar form of decoration, it has been elevated by public acceptance to all the dignity of a decorative style. In other words, instead of partaking somewhat of the nature of an iconoclastic, idol-breaking innovation, it is recognized for its beauties of simplicity and strength and adopted in most of our homes without receiving criticism or special notice, as it would have received a few years ago.

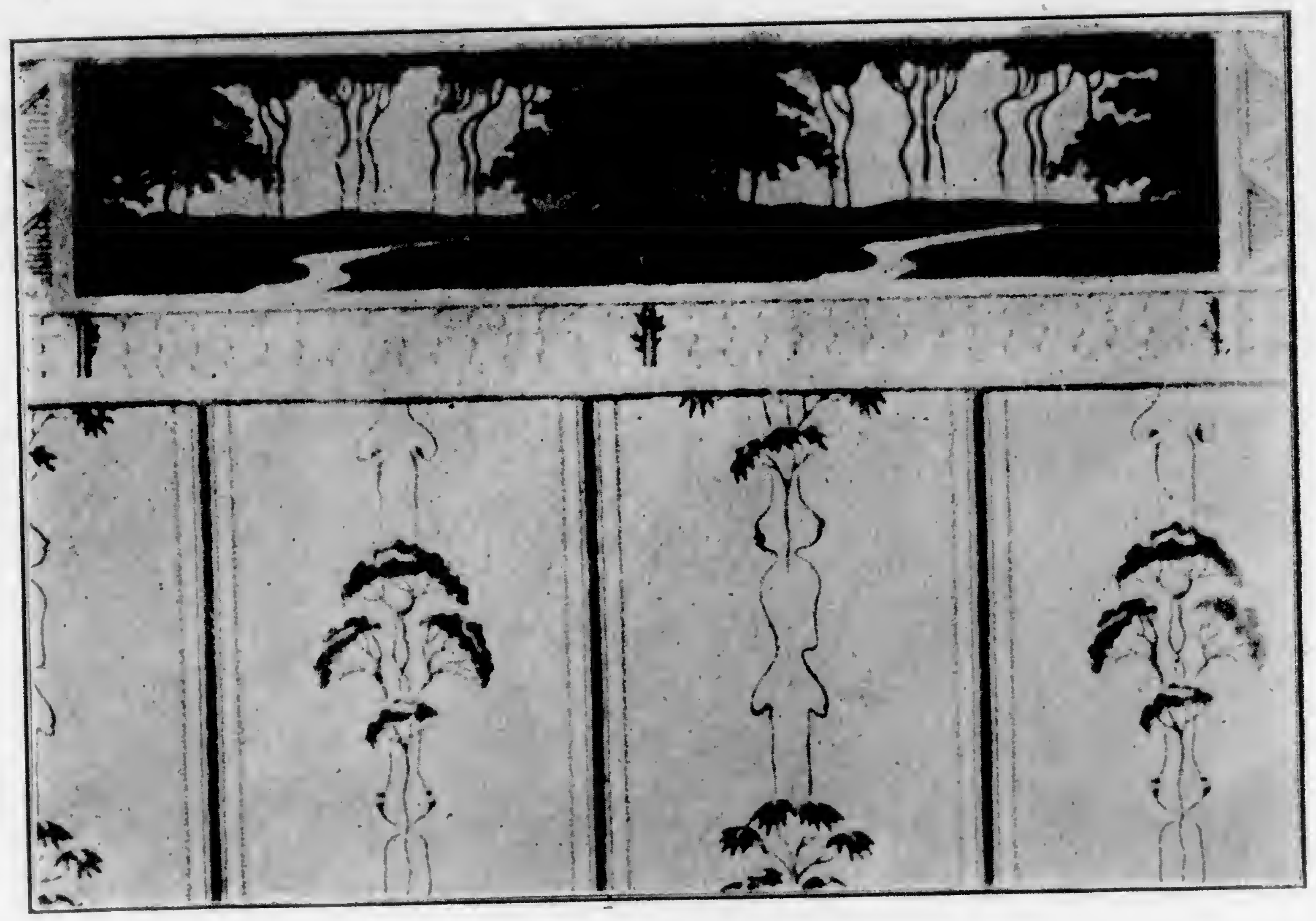
One of the reasons for the more general acceptance of Mission style, lies in the recognition of its defects, which were early seen by its sponsors. The early forms of Mission were rude and clumsy; the curved elements of furniture design were considered anathema; and Mission was something in dark oak that it were well to use very sparingly, indeed, if used at all in a home.

But, by and by, the designers found that a little bit of curvature introduced into the lines of a chair made the straight-edged parts of the chair look all the better for the contrast. They also found that it was possible to make a table without using the trunks of four oak trees as the legs for the piece And again, they discovered that ornament was a fairly good element in furniture design, especially if ornament were used rightly, which means sparingly.

So, all these things having been done by the furniture designers, Mission developed into a real style—not a mere fad in decoration—that "worked" for dining-rooms as well as dens; for bed-chambers as well as for billiard-rooms. And while the furniture was developing, the wall decorators were preparing their innings. Burlap in glaring red was found excellent for the room in dark oak paneling, because something had to be done to pierce the gloom of wood and wainscoting.

Therefore, the paper makers took thought, and decided that dark-oak paneling was really not any more necessary in a Mission room than in a Colonial interior. So, they said, "Let us cut the wainscoting and paneling out of the problem, and proceed as though there were no necessity of a wainscoting in Mission style."

In carrying out their ideas, they prepared charmingly simple designs to conform to the best features of Mission style. These designs recognized also the straightline elements which are always to be found in Mission furniture. And to avoid the scarlets and bright greens of the usual textile wall-coverings, colors made necessary by the mass of dark wood in the wall paneling, they simply substituted pretty grays, creams, pale tints, and even white. These, they found, could be very successfully used with the Mission furniture, and that Mission looked very well in rooms without anything in the way of wainscoting, provided such papers were used as had designs in decorative sympathy with the furniture.



The Mission Wall Paper

The illustration is interesting as showing the latest development of these new-style Mission wall papers. As will be seen, the background is light in tone, and the wall is capped by a sectional landscape frieze, which gives blue and green in masses, interspersed with white between the sections, as they hang on the wall. The straight-line features of Mission furniture are recognized in the vertical stripe of the paper, and also in the convenionalized natural form of the pattern between the vertical lines. The straight and rigid erectness of the lines is helped out by the plant motif in the panels, and the furniture set against the wall which happens to be decorated with paper of this type is made more attractive because the straight elements in the paper pattern subdue the straight elements in the chair or table and accentuate the curved parts of the piece. As to color effect, the pieces in dark wood are in contrast with the wall against which they stand, and are not merged with the wall, as they would be in the case of a paneled room.

The best result of all, however, in using the new Mission wall-paper, is the general improvement it gives the interior. It lightens it up. It makes the whole ensemble more livable and every-day-like. The Mission woods have an opportunity of being seen in full light, and instead of being black, or nearly so, they show pretty brown and chocolate shades, with the texture of the wood reflectng the light here and there under the low-polish of the wax finish. The new papers for Mission style bring the style nearer to every-day use than ever before—The Ideal House.

* * *

A little girl was out walking with her aunt one day. The aunt bowed to a man they were passing. "Who is he, Aunt Jennie?" asked the little girl. Mrs. Littlefield told her that he was Mr. Melrose, the village undertaker. "Oh, yes," replied the child quickly, "I remember him. He undertook my grandmother."—Harper's Bazar.

Floral Upper Thirds

THE floral upper-third form of wall decoration is one of the most pleasing effects which may be obtained in a modern interior. There are several places where it is appropriate; halls, living-rooms, dining-rooms with wainscoting, and even in Arts and Crafts rooms where it is not usually found. The essential basis for an upper-third treatment is that the greater part of the wall be in a flat color, or in a simple, plain wainscoting. The upper third in natural or conventionalized flower pattern sets off and relieves the plain portion of the wall below, not only by a contrast in color but also by the free lines of the design in contrast with the rigid lines of the room moldings.

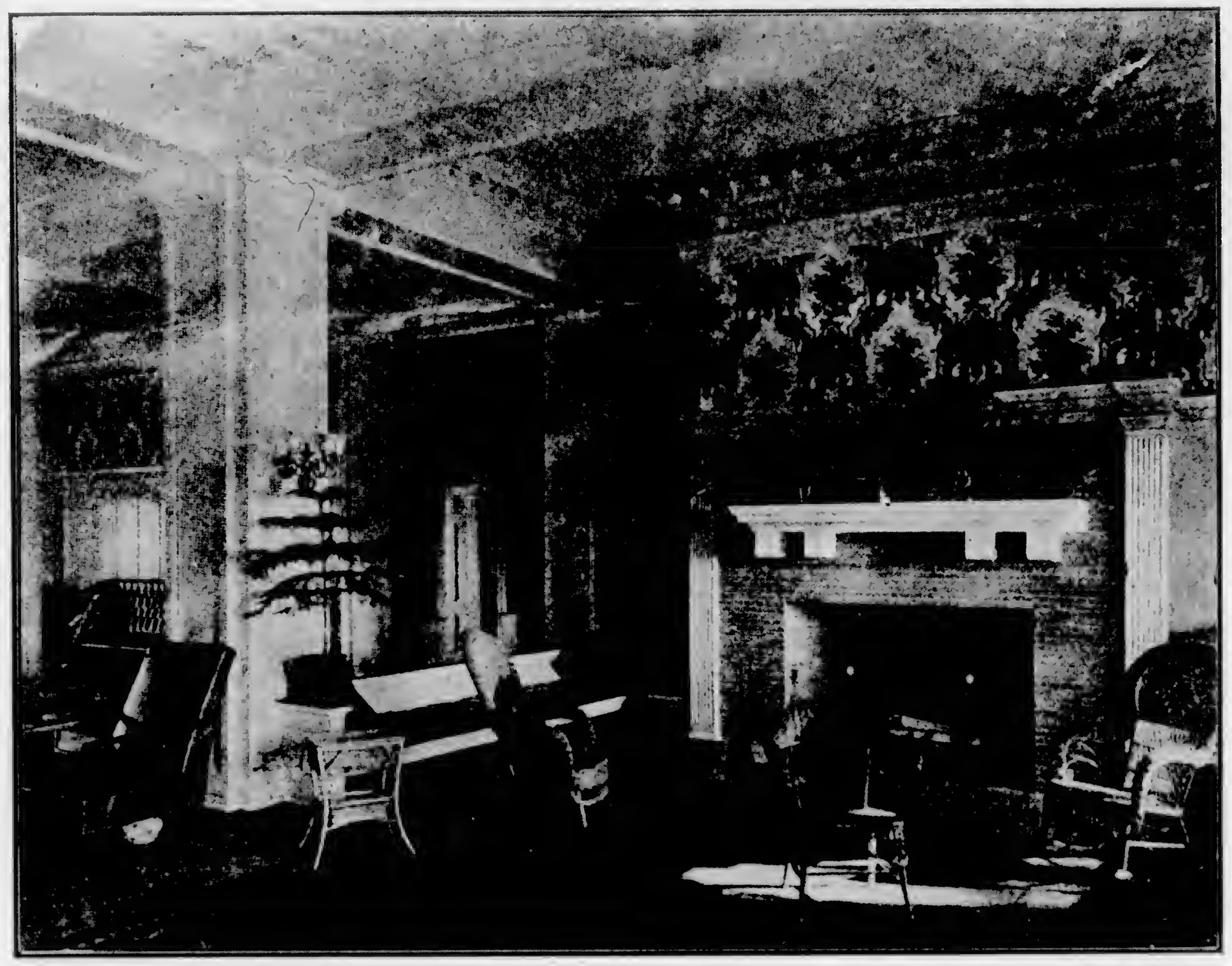
A typical upper-third treatment of the more elaborate modern type is herewith illustrated. The lower two-thirds of the wall is a wainscoting with molded panels, done in white, and with square, enameled classic columns, which are used as motifs for the fireplace facing in red, pressed brick. These are the determining colors for the floral treatment. The white of the woodwork is carried out in the background of the pattern. The brickwork gives the key-color for the flowers, and the green foliage in the upper-third is the key-color for the floor covering. By the same process, any hangings in the room, and cushions on the permanent seat beside the fireplace may be done in the same shade of red that is used on the upper-third. The general color scheme of the room has the darker shade, green, as the basis. Then the lighter colors appear in the portieres and on the wall, and the wall is finally crowned by the upper-third.

The growing ferns on the mantelpiece, and the potted tree beside the column at the left set off the rigid lines of the wood trims of the room acceptably, and also contribute a color note that varies the scheme of color pleasingly. A little touch or two of this kind varies the monotony of effect, and enhances all the artificial decoration in the room. This is one of the valuable features of growing plants in decoration, but they should be used sparingly or their effect is lost.

Whether there is an upper-third treatment used above a wainscoting, as in the illustration above, any picture which may be hung should usually be placed in the upper-third. But if the upper-third is hung above a plain paper, the lower portion of the wall is the better place for hanging pictures, especially if the paper or burlap be dark.

Very pretty upper-third treatments are possible for the dining-room by the use of a plain, dark-toned paper both above and below the chair rail, and a tapestry floral paper for the upper third, using either a plate rail or a picture railing at the dividing line. These tapestry florals may be had with matching papers containing a faint pattern in line.

The writer has in mind a very pretty upper-third treatment, combining the beautiful Japanese grass cloth and a Cretonne in pale yellow floral design with grayish green foliage. A frieze treatment was made by means of the Cretonne, which was also used at the windows and as portieres. The shade of the grass cloth was of a pale yellowish color for which it would be difficult to give an acceptable or accurate name. It matched in color the large yellow flowers in the fabric. Such an upper-third would be exceedingly good for an ill-lighted but rather commodious room. Mission furniture or Arts and Crafts furniture, willow or cane, would be in keeping with a scheme of this character. Grass cloth is obtainable at any high-class decorators at about $4 a roll. It is very effective material, having the delicate "sheen" of silk and the coarse texture of burlap.



A Typical Upper-Third

The floral upper-third is one of the attractive possible treatments for the living room with a panel treatment in plain wood trims. The wood trims are either painted or enameled in white, and the field of each panel filled in with a plain green cartridge paper. The upper portion of the paneling is built in the form of photograph rail, and there is another narrow wood trim in white placed next to the ceiling. The upper-third is filled with a floral paper.

The usual effect of the upper-third style of decorating a wall is to give the room greater apparent height. This is especially the case if the upper-third reach completely to the ceiling. If, however, moldings in plaster, etc., are used, as in the illustration on this page, then the result, if any, is to make the ceiling appear somewhat lower than it really is. The upper-third is at the best when used with a plain body paper, although a score of attractive variations may be easily gotten up.

* * *

An Opportunity for American Architects

An opportunity is offered to American architects to present plans for a handsome villa in Hildesheim, Germany. This takes the form of a competition under the auspices of the German Brick & Terra Cotta Manufacturers' Association, whose officials extend a courteous invitation to American architects to participate in the competition on the ground that they have probably had more experience in planning for this type of construction than the German architects. In America, the use of terra cotta for building purposes has advanced to a very high stage. Full particulars and conditions of this competition can be obtained by application to Karl Dummler, Berlin, Germany. This competition is for a residence to cost 50,000 marks.

Landscape Architecture

Landscape Gardening in California

LANDSCAPE architecture and gardening as an art can hardly be said to exist in California as yet, and this is only natural, because California is one of the newest States of a new country, and the art of landscape gardening is one which, for economic and social reasons, is almost the last of the arts to be assiduously cultivated. Of course a great deal of artificial planting has been done of late years both in public parks and on private ranches and estates; but the object of this planting has been almost entirely practical or horticultural. The rancher who builds a house on a bare plain or hills will nearly always surround it with a mass of eucalyptus or cypress trees, which will serve both as windbreaks and as protection against the sun, while in the fashionable suburbs near San Francisco and further south quantities of trees and shrubs have been planted in the vicinity of the largest houses. But, we repeat, the practice of landscape gardening and architecture as an art can scarcely be said to exist. Local architects who are familiar with the whole field of California rural architecture state that there are scarcely a dozen estates and gardens in the whole coast country, which have been planted for the purpose of making the trees and the shrubs contribute to an architectural effect. Even well-to-do people rarely understand that the character and distribution of the large vegetation on a country estate is vitally associated with the design and the situation of the houses, and that expert advice and assistance are needed as much for the layout and planting of the grounds as for the planning of the buildings. The planting is placed in the hands of some Scotch or German gardener, whose chief purpose is to sell as many plants as he can to his customer, and whose point of view at its best is exclusively that of a horticulturist.

We have been informed by local architects that there is not a single gardener resident in the State who is capable of taking an architect's plan and of designing a planting scheme in reference to the salient architectural lines and masses; and this is a fact which young men who graduate this spring from schools or courses of landscape gardening will do well to bear in mind. A great opportunity awaits them in California, and in case they were competent and trustworthy they would have every chance of building up a lucrative business. Of course, it would for a number of reasons take time. In the first place the vegetation of California is peculiar in many respects, and would require careful preliminary study by a man who had been brought up in the East. Not only does the landscape gardener have an enormously greater

variety of plants to draw upon, but the habit of shrubs and trees common both to the Pacific and the Atlantic Coast is different in each locality. It might well take a newcomer several years of study and practical experience to master the material conditions necessary to the practice of landscape gardening in California. Furthermore, he also would be handicapped in the beginning by the fact that, as we have already pointed out, many people who spend money upon planting do not as yet realize that they need the assistance of a man who unites scientific and technical training with practical experience. Nevertheless he would have every assurance of winning out in the end. He could depend upon the assistance of some of the architects, and he would have behind him the big palpable fact that the coast country of California provides the most wonderful opportunity in the United States for landscape gardening on a large scale.

The opportunity which California offers is extraordinary both because of the great need of extensive artificial planting and because of the unusual resources which the landscape gardener has at his disposal. Those parts of California, in which men are being and will be tempted to erect large country houses, have not been well provided by nature with trees. The coast country, which is best adapted both by climate and beauty of landscape to human habitation, is a country of low and almost bare hills and valleys, and the architect when he comes to design a house in such a neighborhood has a free hand. He can arrange almost with precision for the kind and amount of foliage which he thinks will contribute to his architectural scheme, and if his scheme is an elaborate one, and includes long approaches, terraces and gardens, his plans will necessarily call for an amount of planting to which we are not accustomed elsewhere in the country. Moreover, as we have said, not only are the trees and shrubs upon which he can draw almost inexhaustible in variety, but they possess in certain notable and familiar instances the quality of being peculiarly adapted to the uses of the architect and the landscape gardener. The live oak is under any circumstances one of the most beautiful trees in the world; but it in addition looks extremely well around the right kind of a house.

In such a country so bountifully furnished by nature with the material for its own adornment and so blessed with a mild and invigorating climate, the desire to build and to plant must surely follow upon the opportunity. Californians themselves are better able to afford such luxuries than they were formerly; and it is not only Californians who will build during the next thirty years. Rich American families will want villas and country places in California just as wealthy Europeans want villas on the Riviera. The coast country of California is bound to become the great American pleasure garden, which will be frequented quite as much in the summer as in the winter, and which will constitute an irresistible attraction to all sorts of people with leisure. Of course it will attract many families who merely want to spend money and to loaf, but it will also attract others who will appreciate what a chance it affords to enjoy the highest interests and pleasures of country life. It may be inferred, consequently, that young landscape architects and gardeners are not taking very much risk in settling in such a country. They must be prepared for a longer period of apprenticeship than would be necessary in the East, and probably for certain discomforting experiences at the outset of their career; but in the long run if any of them should fail it would be their own fault.—The Architectural Record.

The Architectural Draftsman With School Training

MUCH has been said and written about the architect and various phases of his professional life, but scarcely any one has yet raised his voice in defense of the architect's employee, that sometimes snubbed but very useful and often indispensable person, the draftsman.

In this discussion it is proposed to speak only of the man who through some advantage or through hard work has really tried to improve himself by studying the art of architecture in some recognized school. Of course this classification does not include many men who are just as capable and equally deserving of success and who have acquired their professional knowledge in some other way, but they in the very nature of things are exceptions, and for that reason may properly be omitted.

How many young men are annually turned out of the various architectural schools of the land, some of them the sons of people in moderate circumstances, who have been able to give their sons the advantages of an education which they deserve, and others who have had to pitch in right after leaving the grammar school or the high school and earn their own living, tracing details in an architect's office and gradually acquiring a commercial value to their employer which after several years has finally enabled them to save enough money to pay their way through the professional school, and this only in cases where they had kept up their academic training and were able to pass the necessary examination; many others started, got discouraged, and fell in the struggle. But it is of the successful ones that we speak; of those fellows who have fought long and hard and who have finally won out. We mean to include also the men who have had even the greater advantage of foreign study and travel.

What happens to all these men after they leave school? Let us follow them from the beginning of their career. They get a job, perhaps, through the school or through their professor. They don't get much pay for a year or so, but gradually catch up with the office-taught man. By reason of better training they are enabled to do more individual and independent work and get along admirably for a time. Then there comes a lull, the office force is very large, work gives out and the men are laid off one by one; finally our subject's turn comes. He has got accustomed to the place and feels rather hard hit; he looks for another job and finds that the people are not as nice to him or as ready to listen to his story as he has previously found them. They ask him many questions, to some of which he must give evasive answers or fail of his purpose.

He gets his first real hard rub, and very often from people who have been through the same mill but who have utterly forgotten the fact, in their altered circumstances. Thus the draftsman goes along sometimes for years, getting experience, it is true, all the while, but with small opportunity to improve his condition.

Even if he is lucky and strikes a steady job, what chance has he for making friends who will be able to help him set up his own office some day? He is cooped up all day long in the office and sometimes many evenings, too, always pushing the pencil (only few get the chance to superintend their employers' work), and in some cases men have been designing for years and don't know their own work when they see it afterward—a truly sad state of affairs.

If the office be a very large one, the men are apt to be specialized, e. g., a man is good on plan, on elevation or on ornament. He is kept working on his specialty to the exclusion of other parts of the work, thus helping to nullify the valuable the valuable training received in school of studying plan, elevation and section together. Of course this scheme in school is very easy to work but often impracticable in an office, especially on a very large job. There is, nevertheless, a tendency of the architect to get as much out of a man commercially as he can, irrespective of its effect on the man, and for this reason alone many men are continually changing offices. Every now and then one meets a friend who used to be with a certain firm and who informs you he is now working for Mr. C. He explains: "You see Messrs. A. & B. are very nice people, but they seemed to think I was particularly useful to them in arranging their business with the building department, so they kept me busy filing plans and making amendments. I didn't mind doing it once or twice, but I felt that they were taking an unfair advantage of me, so I got out. Mr. C. does not get such important work, but I get a chance at many things; sometimes I have entire charge of a little job. It isn't much, but I get a chance to apply some of my school training in solving a complete problem. I feel that my employer has some interest in my welfare besides expecting so much work of me."

The relation between employee and employer is often a false one; both have had good training, and sometimes the draftsman has superior ability, but, of course has to do as he is bid, but the question is one rather not so much what the boss says, but the nasty way he says it. The draftsman gets a piece of work, say a plan; he is told to make it at one-sixteenth-inch scale; there are streets on two sides; the building is to be a hotel; his employer gets the plan when it is finished, and does not further take the author into his confidence. The draftsman, being human, feels hurt, and justly so. Other instances could be cited to show that the relation between the architect and his draftsman is not one of entire confidence and harmony, and too commercial. The draftsman is willing to work at all hours just to keep on the right side of his employer, who does not always reciprocate to the same extent.

At best the situation is a very difficult one, and so much more easily deplored than remedied, and it must be said in justice to the architect that he has realized how serious it really is and how vital the draftsman is to the success of his business; yea, even to his profession. For when he gets big work and lots of it he can, of course, give only a general supervision to the various problems that arise; for the actual working out of the details he must depend upon his draftsman. To secure themselves against being left in the lurch, as well as to help the men, some architects have a practice of lending one another draftsmen when the occasion demands it, but even this scheme is not altogether successful from the architect's standpoint, or very helpful or pleasant for the men.—H. W. F. in The Architectural Record.

* * *

A Safe Fire Escape

THE following plan for a fire escape, for large buildings, was suggested by S. A. Jennings, a Seattle architect: He would have a tower for a fire escape, square in plan, 12x12 feet in the clear. This would allow stairs four feet wide with four platforms between each floor, with a four-foot square well or ventilating shaft. Tower to stand independent of building and to be constructed of reinforced concrete, as also should be stairs and railing. Double action fireproof doors should open into this staircase from each floor. The tower should run above the roof high enough to be pierced on all four sides with louvres of sufficient capacity to carry off the smoke in case of any or all doors fouling in time of fire; the whole to be surmounted by a skylight provided with a large ventilator.

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Regular meetings, the second Friday in January, April, July and October.

Wrecking the Mutual Bank Building

The ten-story Mutual Life building at Sansome and California streets, one of the first Class A structures erected on the Pacific Coast, is being stripped down to the third-story level. This is the second steel and brick building to be wrecked in the United States and engineers are watching the demolition with unusual interest to learn the effect of fire and time upon the building materials and their welding together.

Six stories, containing millions of brick, a great web of steel beams, girders and wind braces, many thousand tons of terra cotta and all the intricate metal fittings, bracings and finishing pieces are to be carried down to the ground within thirty days.

When this structure was put up skyscraper construction was in its infancy. There were only the World building in New York and the Auditorium in Chicago and a few other monuments of this modern departure in architecture and engineering.

A few years ago the Pabst building, located on the site now occupied by the Times building in New York, was torn down. At the time a great deal of comment was made on the fact that the steel in the building had not suffered from rust—that is the steel embedded in masonry.

In taking down the San Francisco skyscraper the same evidence of the durability of steel encased in masonry is being found. All of the steel in the Mutual Life building that was encased in masonry is in a state of good preservation. Only the beams and columns that were sheathed in light tiling suffered. It is declared by engineers that the fire did all the damage.

The Flannery Building

The first reinforced concrete building to be erected in the old business center of San Francisco since the fire is the five-story structure at the gore of Market, Geary and Kearny streets. The owner is H. P. Flannery and the plans were by Stone and Smith, architects in the Midway building. The concrete is built around a heavy steel frame which is intended to support three additional stories when business warrants. The exterior is to be cemented and attractive ornaments of the same material will give the structure a finished appearance. Mr. Flannery has had the greatest faith in the future of San Francisco all along and as early as the middle of May he ordered plans to be prepared ; on June 6th the contract for the steel work was let. The frame was up and ready for the concrete July 28th.

The building will be ready for occupancy in a few weeks. It cost $50,000 and features of the structure will be a private telephone system with a central office in the vestibule connecting by phone every office in the building. A high speed Otis elevator will be installed.

Biscuit Company's Plant

Ralph Warner Hart, architect for the new building for the American Biscuit Company, has returned from the East where he went to gather ideas in modern factory construction. Work has been started on the new building which will occupy an entire block bounded by Broadway, Battery and Vallejo streets. The structure will be of reinforced concrete and will cost $400,000. It will be absolutely fireproof. The fixtures and what little furniture that will be required will be of metal. The foundations are fast nearing completion, day and night shifts being employed.

Nine-Story Hotel

The American-Hawaiian Engineering and Construction Company has taken the contract for the erection of a nine-story Class A hotel on Turk, near Hyde street, San Francisco, for D. S. Dorn. It will be known as the Hotel Rex. The front will be a glazed brick and the lobby of the hotel will be of marble and stucco work. The building will cost $200,000. Only five stories will be erected at first. Dodge & Allen are the architects.

Phelan's Great Building

Former Mayor James D. Phelan has decided upon the height of his new building which is to replace the old Phelan structure on the north side of Market street. It will be ten stories with a steel frame. Whether reinforced concrete, stone or brick will be used is as yet undecided. The building will represent an outlay of $3,500,000. It will take about two years to build the structure and it is hoped to start work by the first of January.

Two Churches

The First Presbyterian Church of San Francisco is to build a temporary edifice on Washington street, near Van Ness, to cost $7,500. Cook & Young have the general contract.

The St. John's German Evangelical Church has entered into a contract for all the work except hardwood finish, painting, shades and chandeliers, for a two-story frame church building on the west side of Larkin street, near Vallejo. The building will cost $10,000.

Electricians' Banquet

A notable banquet was held in San Francisco a few evenings ago, the participants comprising about 125 of the leading electrical contractors and representatives from each of the several electrical supply houses in the city. The affair was quite informal and was arranged by a committee of engineers and contractors, who had in mind the bringing together for better acquaintance and social intercourse the men in this branch of the building industry. A fine menu was made doubly enjoyable by a musical and literary program furnished by professional talent. During the evening speeches were made in favor of a permanent organization, and various plans for starting an electrical club were discussed.

To Restore Wells Fargo Building

A contract has been let to M. F. Gale by the Wells Fargo Company for stripping the company's big office building at the corner of Mission and Second streets. Plans have been prepared by Architects Meyers and Ward, and they call for two additional stories, making the building eight stories. It is possible that artificial stone will be substituted for the granite for the first floor, as the natural stone was badly damaged by the flames. The upper stories will be of pressed brick and terra cotta, the same as before. There will be a wider light shaft in the new building, and to permit this some of the offices will be made smaller. The improvements will represent an outlay of $500,000.

Oakland Masons to Build

The Scottish Rite Masons have decided to sell their property at Fourteenth and Harrison streets, opposite the site of the new Oakland Hotel. They will erect a new cathedral on a site at the southwest corner of Fifteenth and Madison streets, which has been purchased by the cathedral association.

Progress of New Work

On Sansome street, work was commenced during September on the Mutual Life Insurance Company's building. The repairs to the Kohl building are nearly completed, and good progress is being made on the Merchants' Exchange. The work on the latter is very extensive and includes almost entire new exterior walls. On Market street, near Sansome, premises are now being cleared for a permanent building which will be occupied by a large stationery and publishing house. The contract has been let and it is expected that the work will be completed by February 1st next. The white-marble front of the Security Savings Bank building, on Montgomery street, near Pine, is being restored, and the American National Bank, in the Merchants' Exchange building, has awarded contracts for elaborate fixtures of marble and bronze for its banking-room.

Orpheum to Build

The Orpheum Amusement Company has purchased Hamilton Hall, at the corner of Thirteenth and Jefferson streets, Oakland, from C. Mayer for $55,000. The same purchaser recently acquired the Raymond

Hotel property, which extends through from Twelfth to Thirteenth streets. The Orpheum Company will shortly commence the erection of a first-class amusement house on the property.

New Architectural Firm

E. Matthewson, the Fresno architect, has formed partnership with N. W. Mohr, a draughtsman of some prominence, and an office has been opened at No. 622 Golden Gate avenue, San Francisco. The new firm already has considerable work of importance including a $30,000 business block and several residences.

Barron Estate's Hotel

The Woodruff Construction Company has the contract for the erection of a seven-story hotel for the Barron estate at the corner of Taylor and Geary streets. The hotel will contain 280 rooms and will be built on a plan similar to the new Astor House in New York. It will cost $300,000.

Contract for Cotton Bros.

Goodall, Perkins & Company have given Cotton Bros. the contract for the erection of a two-story brick building on the site of the old Perkins property at the gore of Sacramento and Market streets. Nearly all the old tenants have leased store or office room in the new building, which is considered a positive indication that the old firms that formerly were in business in that part of the city will return to make Market street what it used to be from a business standpoint.

Personal Mention

The firm of Gibson & Paradice, architects, with offices at 701 Swetland Building, Portland, Oregon, has just been launched. Its personnel is composed of Frank B. Gibson, for the past five years superintendent of construction for Richard Martin, Jr., architect of Portland, formerly of Detroit, Mich., and Frank H. Paradice, Jr., architect of Denver, Colorado, where he has been in business for the past five years.

Retire from Business

The Cahill & Hall Elevator Company, formerly at 2646 Union street, announce that they have retired from business. The company formerly did quite a large business in elevator construction.

Building Reports

Apartment house—McAllister and Devisadero streets, San Francisco.

Architect—Julius Krafft.

Owner—William Wilson Co.

Cost—$35,000.

The building will be a frame structure, three stories high and will contain five stores and ten apartments.

Office building—Market street, near Third, San Francisco.

Architects—Reid Bros., office in new Butler building, Geary and Stockton streets, San Francisco.

Owner—Claus Spreckels.

Cost—$200,000.

Plans have been finished and bids are now being taken for a six-story building to be known as the "Spreckels Annex." The old annex was five stories. It will be built between the Call building and Uhl Bros. building. The structure will be Class A and the steel frame will be faced with stone.

Apartment house, Turk street, between Larkin and Polk, San Francisco.

Owner—Mrs. Charlotte S. Clark.

Architects—Meyer & O'Brien.

Cost—$140,000.

Work has been started by the Schofield Construction Company on a five-story building of reinforced concrete. There will be stores on the ground floor and 180 rooms above.

Four story reinforced concrete building—southeast corner of Ellis and Anna streets, San Francisco.

Architects—Coxhead & Coxhead.

Owner—Irving Scott estate.

Cost—$100,000.

The building will be 100 by 110 feet and will contain 200 rooms with outside baths and will be known as the Pacific Grand Hotel. The lobby will be finished in white marble wainscoting, with white marble columns. There will be a cafe facing on Anna street. Bids are now being taken and the contract will be let so the building can be completed by May 1st.

Four-story and basement building—Clay Street, San Francisco.

Architect—W. H. Weeks, Merrimac Building, San Francisco.

Owner—Miss Pauline Torpey.

Cost—$45,000.

The building will be of brick and terra cotta and will contain stores and rooms.

The same architect has plans for a three-story brick building for H. E. Irish, to be built on Stockton Street, San Francisco, at an outlay of $20,000.

Three story and basement building, Market street, west of Marshall Square.

Architect—Herman Barth.

Owner—Bernard Schweitzer.

Cost—$50,000.

The building will be of pressed brick, 55 by 100 feet, and will contain stores and offices.

Three-story rooming house—Mission and Eighth streets, San Francisco.

Architect—Julius Krafft.

Owners—P. J. and J. McGovern.

Cost—$25,000.

The building will be of brick and will contain stores and rooms. No contracts let yet.

Pavilion and bath house—Santa Cruz.

Architect—W. H. Weeks, Merrimac building, Market and East streets, San Francisco..

Owner—Santa Cruz Beach, Cottage and Tent City Corporation.

Cost—$250,000.

Contracts are about to be let for a handsome structure to replace the one destroyed by fire early in the summer. The style will be a pleasing combination of Spanish and Mission, with plastered exterior and imposing domes richly gilded. The very best sanitation and plumbing will be installed and the bath house will contain cement pools lined with tile and novice glass.

Bank building—Salinas.

Architect—W. H. Weeks, Merrimac Bldg., corner East and Market Sts., San Francisco.

Owner—Bank of Salinas.

Cost—$30,000.

The building will be of sandstone, with mahogany interior. Bids are now being taken.

Residence—First Street and Hensley Avenue, San Jose.

Architect—W. H. Weeks, Merrimac Bldg., San Francisco.

Owner—Mrs. Annie Dougherty.

Cost—$20,000.

The house will be colonial in design, cement foundations and all modern improvements. Plans are about finished.

Carriage warehouse—Twelfth and Jackson streets, Oakland.

Architect—A. W. Smith, 1004½ Broadway, Oakland.

Owner—Coast Carriage Company.

Cost—$60,000.

Contractor—Cary & Hale.

Ground has just been broken for this building which will be two stories.

Three-story brick building, Clay street, San Francisco.

Architects — Meyers & Ward, Wells Fargo Building.

Owner—Hyman Bros. Co., incorporated.

Cost—$35,000.

The same architects also have plans for a three-story apartment house for Ruth and Sol. Hyman, to be built on Hoff avenue and Sixteenth street. It will be a frame structure.

City Hall—Van Ness and Hayes Sts., San Francisco.

Architect—City Architect Shea.

Cost—$80,000.

Bids are to be taken at once for the erection of a temporary structure, to be of wood, with metal lath exterior, covered with cement and ornamental stucco work. The building will have a frontage of 284 feet on Hayes street and 120 feet on Van Ness avenue.

Seven-story store and office building—First and Market Streets, San Francisco.

Architect—Ben G. McDougall, Monadnock Bldg., San Francisco.

Owner—Sheldon Estate.

Cost—$240,000.

Plans are now being completed for this building, which will be seven stories, of reinforced concrete; five stores; 28 offices to a floor; corrugated bars for reinforcement; mosaic corridors; two elevators.

Class C, stores and lodgings, Polk and Bush streets, San Francisco.

Architect—Julius Krafft.

Owner—Henry Sahlein.

Cost—$50,000.

Plans have been finished and a portion of the contracts have been let for a five-story building, of brick and terra cotta and all modern conveniences.

Hotel and Store building—Mission and Howard streets, San Francisco.

Architect—Julius Krafft, 509 Golden Gate avenue, San Francisco.

Owner—William Wilson Company.

Cost—$40,000.

The building will be four stories, Class C, of brick and terra cotta. The contract for the foundation only has been let.

THE
Architect and Engineer
OF CALIFORNIA

Published Monthly in the interests of the Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast by the Architect and Engineer Company.

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SAN FRANCISCO BORN AGAIN

San Francisco is surely rising from its ashes. One needs only to look about him to be convinced of this fact. New buildings of substantial character are going up on all sides; the great sky-scrapers, that were not seriously damaged, have been stripped of loose brick and stone; the steel frames have been repaired and strengthened, and the work of providing new facings, either of brick, terra cotta, stone or cement is progressing faster than even the most enthusiastic ones predicted. Several of the big office buildings are occupied; others will be ready before the first of the year.

During the months of June, July and August, building contracts aggregating $8,287,187 were made. During September, 1050 building permits were issued. Bank clearings for September reached the amount of $198,712,503. For the same month in 1905 the clearings totalled $168,329,716, showing an increase of 18.04 per cent.

Thirty-five thousand men are doing construction work and thousands more can be used. Railroads entering the State report that traffic has increased enormously, both on colonist and tourist tickets. The population of San Francisco is placed at 370,000.

Architects have all the work they can attend to. Much of this was at first of a temporary nature. Now it is nearly all permanent work. Owners are asking for fire-proof construction, and the latter is going to become a marked feature in the rebuilding of the city. Some very beautiful designs for office buildings, fraternal halls, churches, etc., are being made by San Francisco architects, and it is only a question of time before the city by the Golden Gate will have regained its coast supremacy, architecturally as well as commercially.

A SNAP FOR JUNIOR DRAFTSMEN

The Western Architect declares that the "cubs" in the architects' offices of Buffalo are in a fair way to enter competitions and obtain spending money outside of their salaries. The County Committee proposes to obtain designs for county buildings by competition, pay an expert $100 for his work, and award the three best drawings $100, $75, and $50, respectively, the drawings then to become the property of the county "for any use the board may see fit to make." The farmers in North Dakota might be excused for having so small a conception of the value of an architect's services and knowledge of the quality of work such an arrangement would bring, but it is hard to imagine how such crass ignorance can be found in Buffalo.

* * *

NEW FEDERAL BUILDINGS

The large number of appropriations made at the last session of Congress for the purchase of sites and the erection thereon of over 150 new Federal buildings throughout the country has directed with renewed interest some attention from the profession to the provisions of the Tarsney Act, which authorizes the Secretary of the Treasury to open competitions for drawings, plans and specifications for such public buildings as he may select.

While the majority of these buildings will be designed in the office of the Supervising Architect of the Treasury Department at Washington, who may justly be given credit for the successful and very creditable showing which has been made by his office, yet there is an inclination among many to doubt that the best results can be attained, should he be required to undertake immediately such a large task, and bring it to a speedy and satisfactory conclusion, and there is a hope that this condition and the public interest will induce the Secretary of the Treasury to select a generous number of the buildings to be erected under the Tarsney Act. A synopsis of the regulations governing competitions under this act will be published in the November issue of the Architect and Engineer.

Appropriations now available and of special interest in this State are: Enlargement of present site and new Sub-Treasury building, San Francisco, $375,000; Postoffice and Custom House, San Diego, $150,000; Postoffice, Custom House and Land Office, Eureka, $120,000; Postoffice, Santa Rosa, $70,000; Postoffice, Santa Cruz, $15,000.

W. A. NEWMAN, Architect.

* * *

THE NEW CITY'S STREETS

San Francisco's character in respect to streets will be determined by the votes of the people in November. I believe our people have the courage, the stamina and the resolution to set a standard in this matter of vast street improvement which the whole world will notice, and to place ourselves and our city in the front ranks of the great doers of things. We, of course, know that it will pay, but let it be done without this thought—let it be an expression of our love, trust and confidence in our own.

No city on earth has more splendid support from natural environment, climate, etc. We could make it the show city of the world if we would, and we shall if we once realize its value. If the tourists to Italy pay the expenses of the government, what would it mean to us who have, besides things to see, a country teeming with riches and resources to sell and develop through our visitors who would cast their lot here and become workers with us.

HERBERT E. LAW.

The Publisher's Corner

Chubbuck & Harris.

Chubbuck & Harris, sales agents, with offices in the Atlas building, No. 604 Mission street, are handling strong lines of building materials and report business exceedingly good. They are introducing to the local market Holdtite hardwall plaster, a superior gypsum plaster manufactured in Amboy, Southern California, and in the last two months have made sales aggregating 3000 tons. The reconstructed Fairmont Hotel and Merchants' Exchange office building are being plastered solely with Holdtite, besides numerous other smaller buildings.

The above firm is also selling agent of the celebrated "Cleveland" Expanded Metal Lath, and report a sale of 60,000 square yards of this lath for use in all partitions and ceilings in the Merchants' Exchange. The lath was selected over all other makes on account of its rigidity, strength and plaster holding qualities.

Chubbuck & Harris also handle lime, brick and cement, and while a young firm, being in business but a few months before the conflagration, are making themselves a strong factor in the building world by strict attention to business, reasonable prices, and prompt deliveries.

Hercules Plaster Fibre.

The Hercules Manufacturing Company is running its factory at 221 San Bruno avenue, San Francisco, day and night to keep up with orders. The company's business has doubled since the fire. The plaster containing Hercules fibre stood the earthquake well. The company manufactures a special fibre for hard wall plaster, which is gradually taking the place of other substitutes. Hercules fibre is indestructible. Length of time in mortar, hot lime, or even hot weather does not injure or destroy it. Lime does not eat or destroy vegetable matter as it does animal matter. Hercules plaster fibre is purely vegetable. Hercules plaster fibre is purely sanitary, as it is free from all germs and odor.

Eugene Dietzgen Company Busy.

The Eugene Dietzgen Company is again located in the down-town business part of San Francisco, and architects and engineers are elated. This company is the most popular of the several firms in San Francisco handling drawing materials, surveying and mathematical instruments, and probably does as much business as all the other concerns combined. The company's prices are right and its goods are the best. For the present down-town quarters have been established at 35 and 37 Fourth street. When the building is finished the firm will return to its old location at First and Stevenson streets, where it will have about 9000 square feet of room. The company is maintaining a blue print department at 2125 Union street.

The Gregory Hardware Company

The Gregory Hardware Company, incorporated, 519-521 Golden Gate avenue, San Francisco, are handling, in addition to their full line of builders' hardware and mechanics' tools, a full stock of sugar pine sashes and doors, and also have a corps of competent glazier's in their employ, who are kept constantly busy on work in their line.

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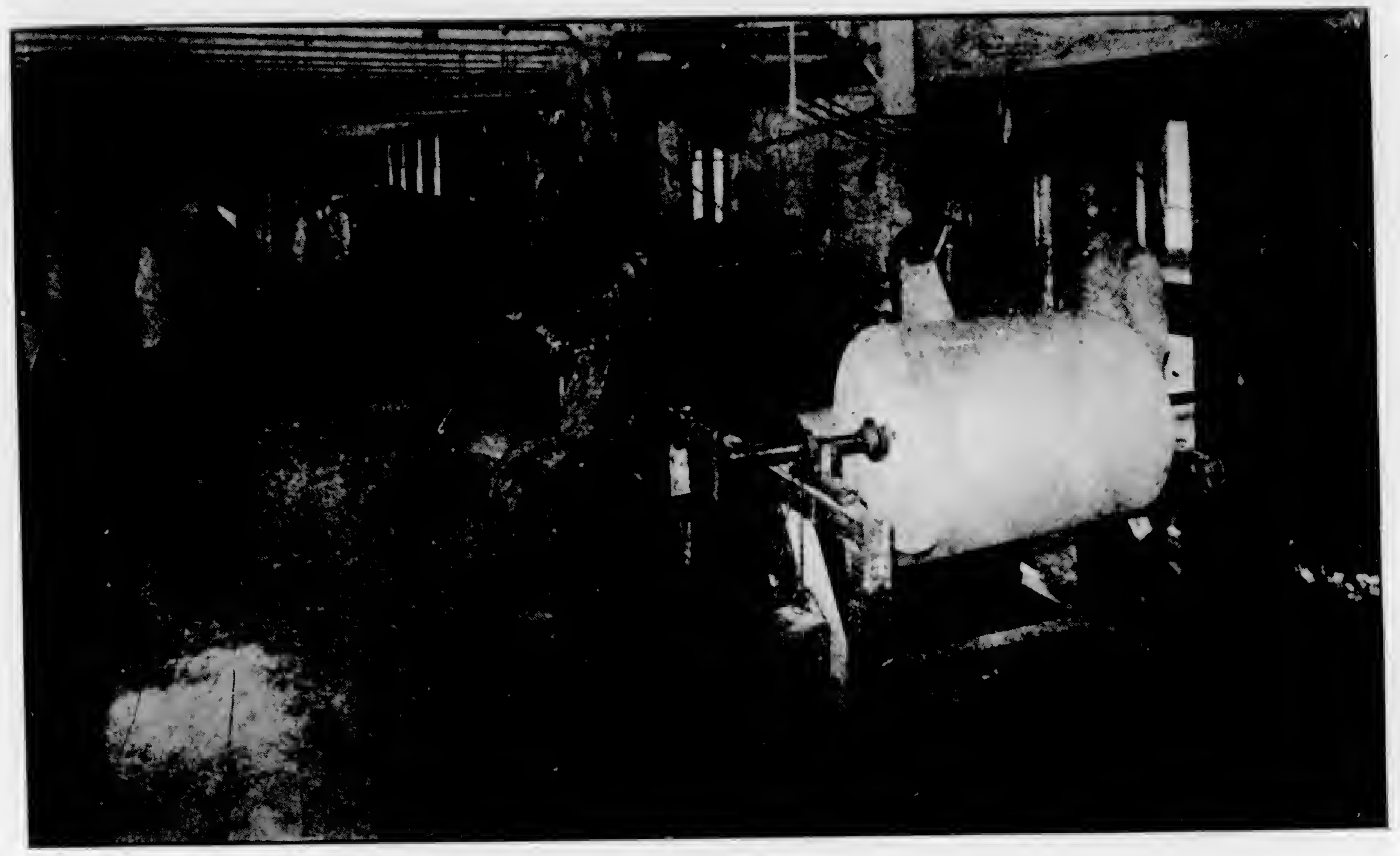

A Flexo Machine in Operation

Demand for Flexo Paper.

Hardware dealers who are handling the new fire-proof roofing paper, Flexo, report a steady increase in the demand for the paper, and the factory in East Oakland is being run day and night to keep up with orders. The following hardware dealers are handling the paper: Gregory Company, 519 Golden Gate avenue; Osborn Company, 517 Golden Gate avenue; Bennett Bros., 1034 Mission street; W. J. Donnelly, 11 Stockton street; Large & Moore, 1180 McAllister street, and others. W. J. Piatt, president of the Flexo Company, is also the president of the Bayside Manufacturing Company of East Oakland, says the call for the new roofing paper exceeds the company's expectations. To accommodate the trade a branch salesroom has been opened at 3279 Sixteenth street, with E. D. Thompson as manager.

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REGISTERED
READY ROOFING
DURABLE, EASY TO LAY, FIRE-PROOF, INEXPENSIVE
Factory: E. Oakland
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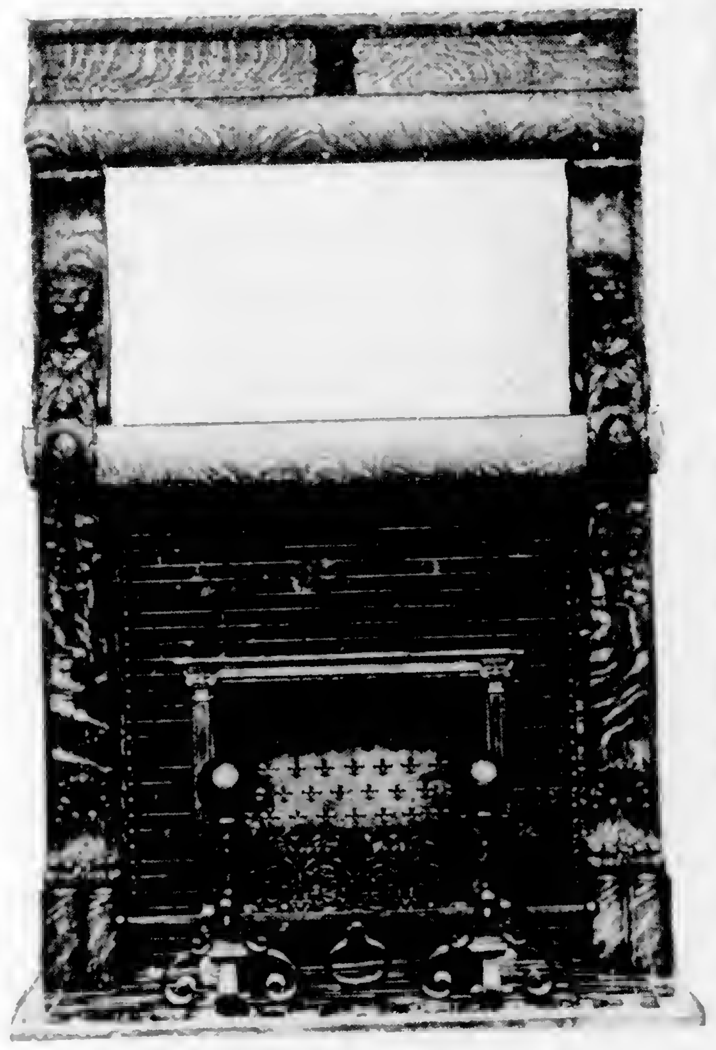
Glass Business Trebles.

Holt & Habenicht, who were one of the first glass dealers to resume business after the fire, have so much to do that they are in search of larger quarters. They hope to rent the store adjoining their spacious shop at 269 Fell street.

Rudolph Habenicht is the new member of the firm and he attends principally to the outside work. He is a good business man, and Mr. Holt is authority for the statement that since the new partnership began the business has trebled. The firm is making a specialty of plate glass of all sizes; also a fine grade of prism glass, besides colonial, moss, ground and colored glass. Holt & Habenicht have the contract for supplying all the prism glass in the Jas. Flood Building, which is soon to be occupied by the Southern Pacific and other railroad offices.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History of the Yale Lock

Herewith is quoted several paragraphs from the Yale & Towne Manufacturing Company's catalogue on the history of the Yale Locks which is the history of a magnificent industry.

"There are chapters in the history of mechanical science which are as epoch marking as the achievements of soldiers or politicians in the history of a nation, and a bit of such history relating to one of the industrial arts, is here briefly recorded in the rise of the great Yale & Towne Manufacturing Company."

"Linus Yale, Jr., who was born in 1821, at Newport, New York, invented the lock, now so universally associated with his name, about 1862, and his original patents expired long since. His invention, and its subsequent development by his successors, have revolutionized the art of lock making in America."

"In October, 1868, Mr. Yale, then 47 years of age and apparently in good health, united with Mr. Henry R. Towne in organizing the corporation now known as The Yale & Towne Manufacturing Company, and in purchasing a site at Stamford, Connecticut, where the erection of a suitable factory building was begun. On December 25, 1868, Mr. Yale died suddenly, of heart disease, in the city of New York, leaving to the young enterprise the heritage of his brilliant inventions.

"In 1869 Mr. Towne succeeded to the presidency of the company, and its growth and development since then have been under his management. During these years the plant at Stamford has grown from a small workshop, employing about thirty men, to a great industrial works, covering some twenty acres of ground, with which, in 1894, the company associated, by purchase, an additional plant at Branford, Connecticut, the employes in the two establishments numbering over fifteen hundred persons. The products of the Company have increased correspondingly, both in variety and volume, and now embrace the most extensive line of builders' hardware in the world (including goods of the highest, cheapest, and all intermediate grades), cabinet and trunk locks, padlocks, door checks, bank locks, prison locks, postoffice equipments and chain blocks."

The exclusive San Francisco agency for this superlatively excellent line is held by the now well-known though new firm of Brittain & Company, Inc., on Van Ness avenue, corner of Turk street, whose large line of builder's hardware and tools is making it an important factor in the rebuilding of the coast metropolis.

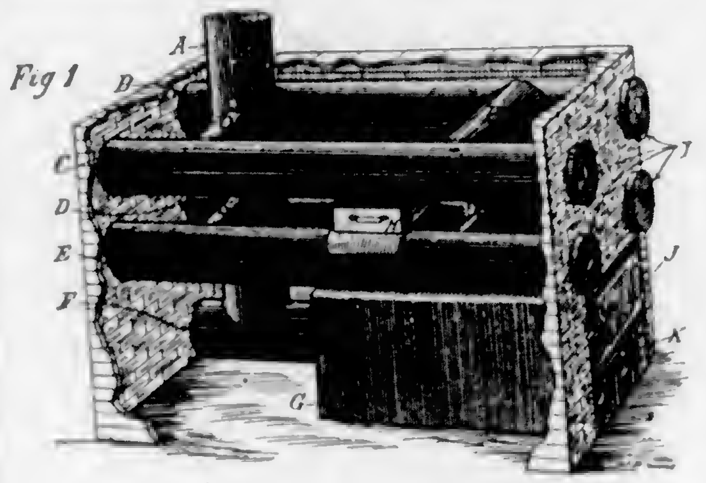
To Build on Market Street.

The south side of Market street shows today the greatest activity in the building line and a marvelous change may be seen on this thoroughfare during the next six months.

Among the first to build will be Tobin & Driscoll, who intend to erect a four-story building on the south line of Market street between Sixth and Seventh. William Ede has announced his intention to build next to Tobin & Driscoll, but no decision has been reached as to the height of the building. James Coughlan, who owns a lot above where the Windsor Hotel stood, will put up a three-story reinforced concrete building. A. Legallet is considering building on his property, which is adjacent to that of Coughlan. C. L. Tams will build on the south side, between First and Second streets, and the Mark Sheldon estate will also put up its big building, which will also be on the south side of Market. Herman Levy is to erect a three-story building between First and Second.

Mr. Hicks to Build.

Lewis A. Hicks of the firm of Lindgren & Hicks, well known contractors, is to erect a $15,000 residence in Berkeley. The house will be entirely of reinforced concrete and will be one of the finest residences of any pretention to be built in this section of reinforced concrete.



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Reed & Company.

Reed & Company, engineers and contractors, of 44 Market street, call attention to the fact that they are prepared to do all of the work and furnish all of the material in connection with the cleaning up and removing of debris, as well as the construction of all classes of buildings.

In this connection the company states, that owing to exclusive rights upon the bunker at Mission Wharf No. 2, they are prepared to handle debris in a more expeditious and economical manner than many others, and are also in a position to secure all grades of building materials at the lowest market prices.

Artificial Terra Cotta.

O. S. Sarsi and the T. V. Galassi Mosaic Company have just finished the imitation terra cotta in the light court of the James Flood Building. The work is a fine imitation of the genuine terra cotta, the difference being detected only upon very close examination. Mr. Sarsi has quite a little work of this class on hand, besides some artificial stone ornamentation for reinforced concrete buildings.

Master Builders Organize.

The Master Builders of Alameda county have organized an employers' and contractors' association. The new association is a combine on the part of all the builders and contracting firms in the county. Thus far no one but employers of union labor have been admitted to membership in the association. The purpose of the body is to have an effective organization to deal with the labor unions, when any questions of difference may arise, in order that they may be speedily and intelligently adjusted. It is one of the regulations of the new body that no craft or branch of any trade holding membership in the association shall at any time change the existing scale of wages in their craft, without first obtaining the consent of the entire body. In the event of any arbitrary action on the part of a craft or branch of trade or the employes thereof it will result in a complete tie up and cessation of all work until the trouble has been adjusted.

The new association will act in conjunction with a similar body in San Francisco. The master builders say that they have been compelled to form this association for their own protection.

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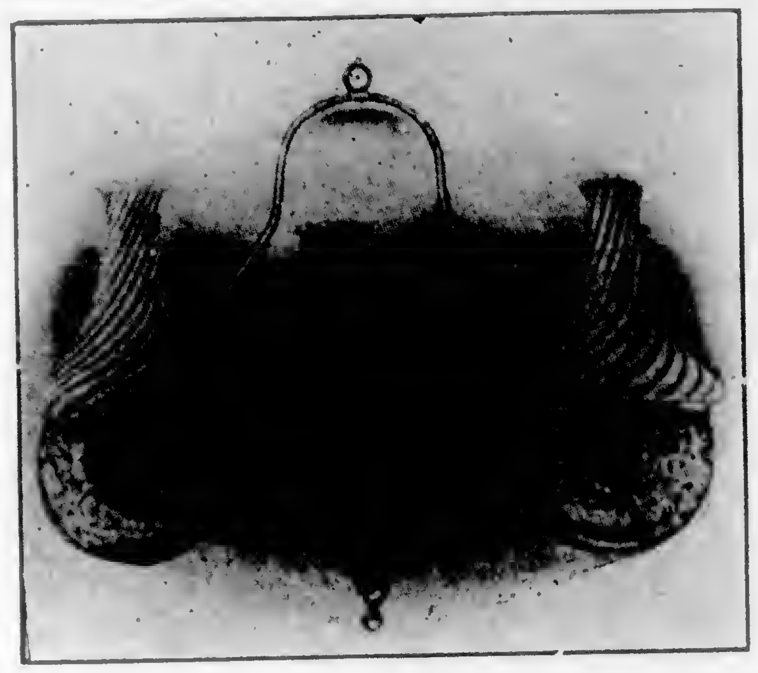

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Oakland Y. M. C. A. Building

It is announced that Oakland is to have a new Y. M. C. A. building. It is now several years since the former building at the corner of Clay and Twelfth streets was sold. At that time it was stated that a new building would immediately be erected on the lot purchased at the corner of Fourteenth and Jefferson streets, but for various reasons work was delayed.

The directors of the association have decided to put up a three-story fire-proof structure. There will be a large reading-room, a spacious gymnasium and an auditorium capable of seating 1200 persons in the new building. The structure will be according to the latest ideas of construction employed in similar buildings in the East.

Plans Fine Building

The Southern Pacific Company's plans for the improvement of the block bounded by Thirteenth, Fourteenth, Franklin and Webster streets, Oakland, call for an arcade structure to cost $250,000. Tenants at Thirteenth and Franklin streets have been ordered to vacate, the company desiring to install temporary offices in the building for District Freight and Passenger Agent Forsythe. The offices at 12 San Pablo avenue will soon be vacated to make room for the new First National Bank block.

Berkeley School House

Architect Board of Berkeley is making plans and specifications for a four-room Mission-style school house for the Peralta school district.

The clerk was also instructed to advertise for a building site to be secured north of Berryman and east of Shattuck avenue.

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The drawing and verse which appears on Page 35 in this issue of the Architect and Engineer is taken from the September number of Building Management, pubished in Chicago and New York.

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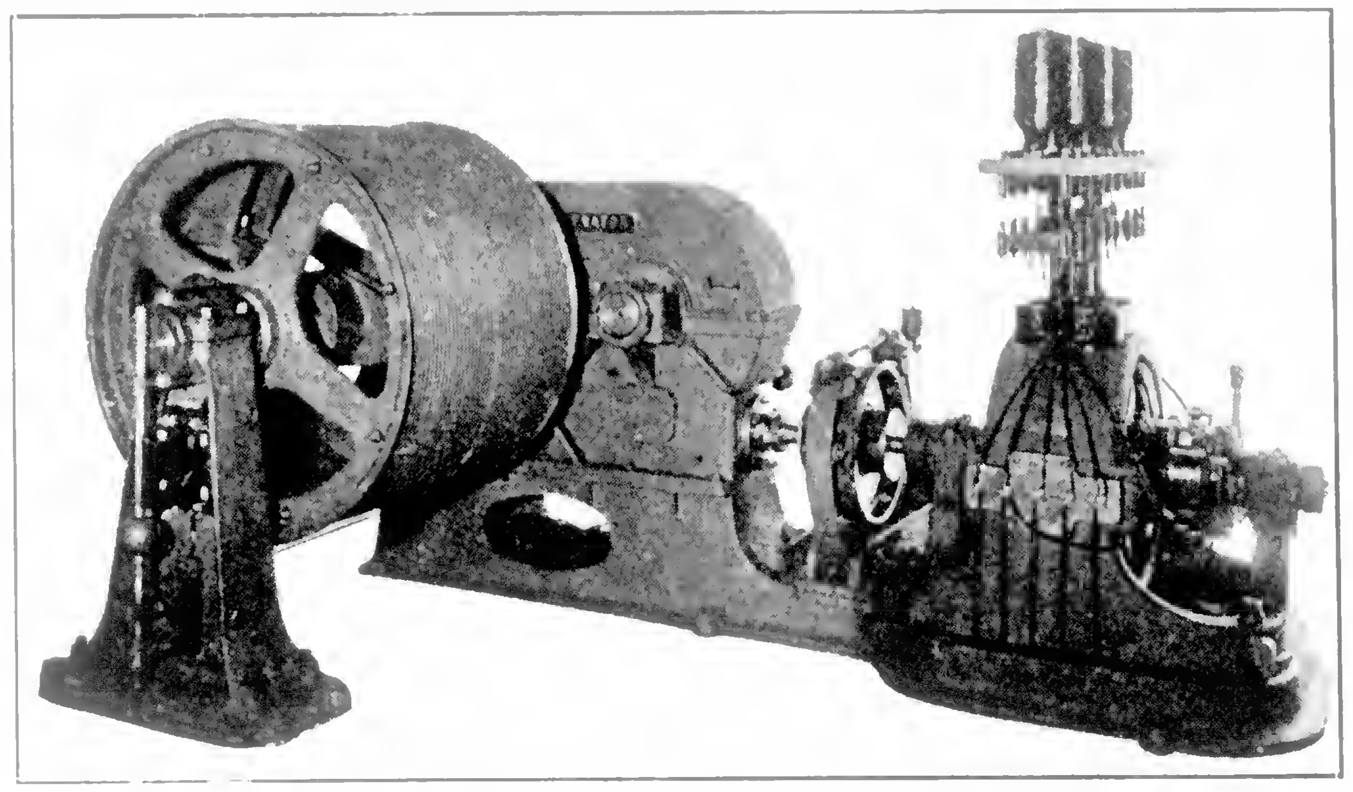

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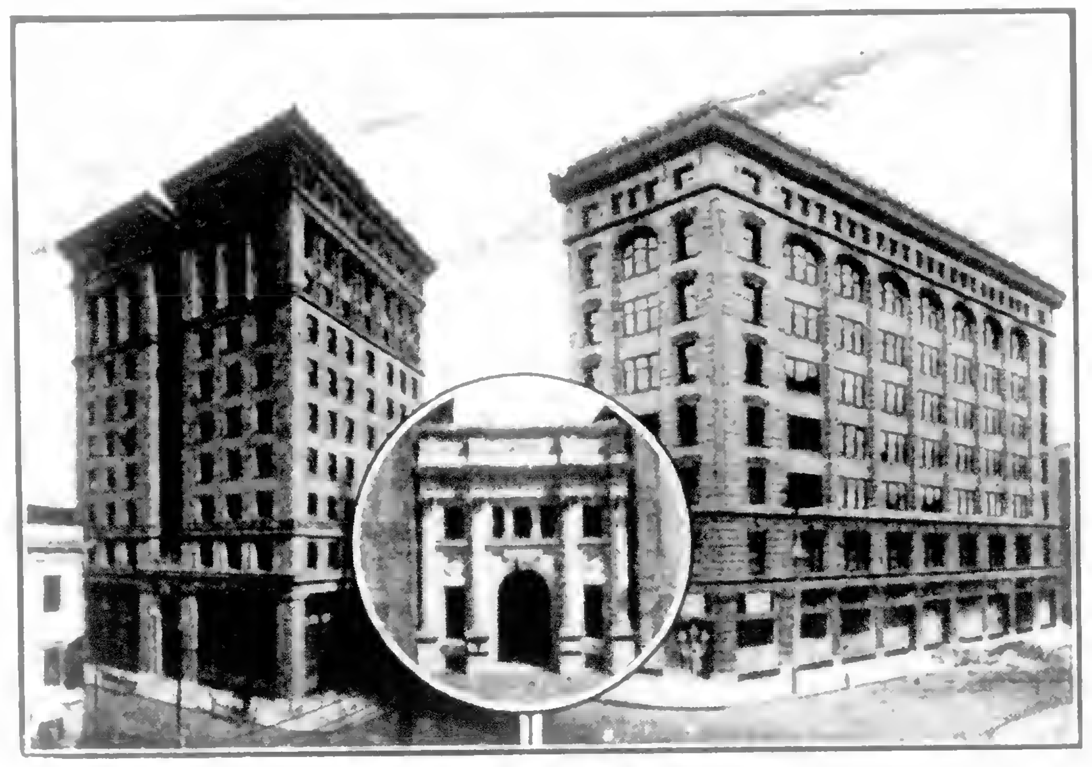

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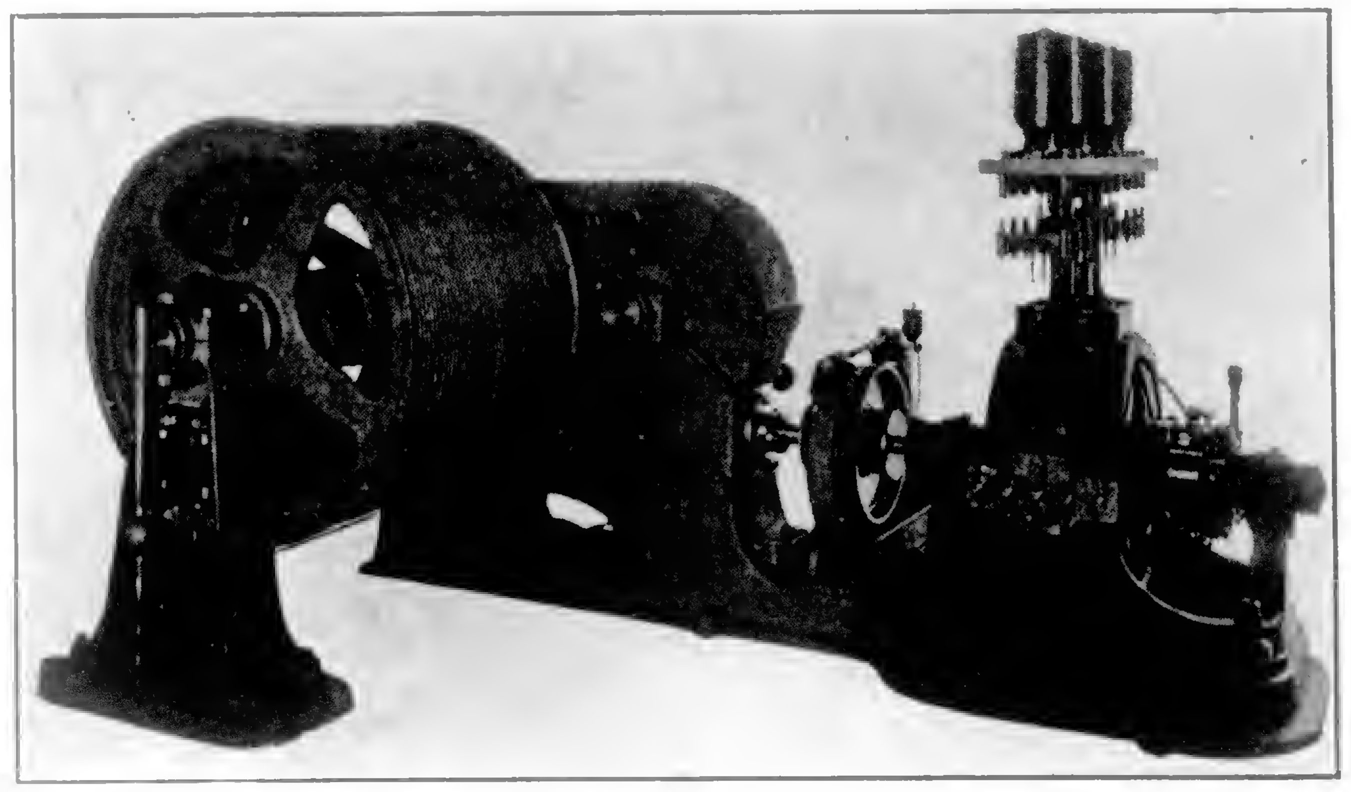

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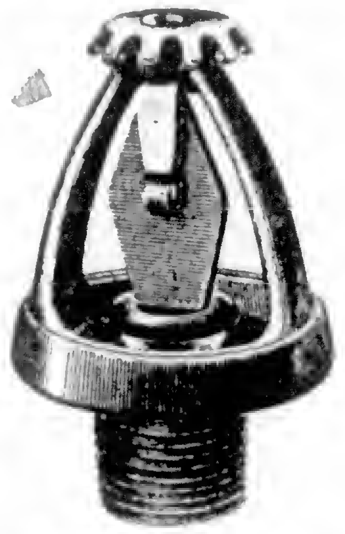

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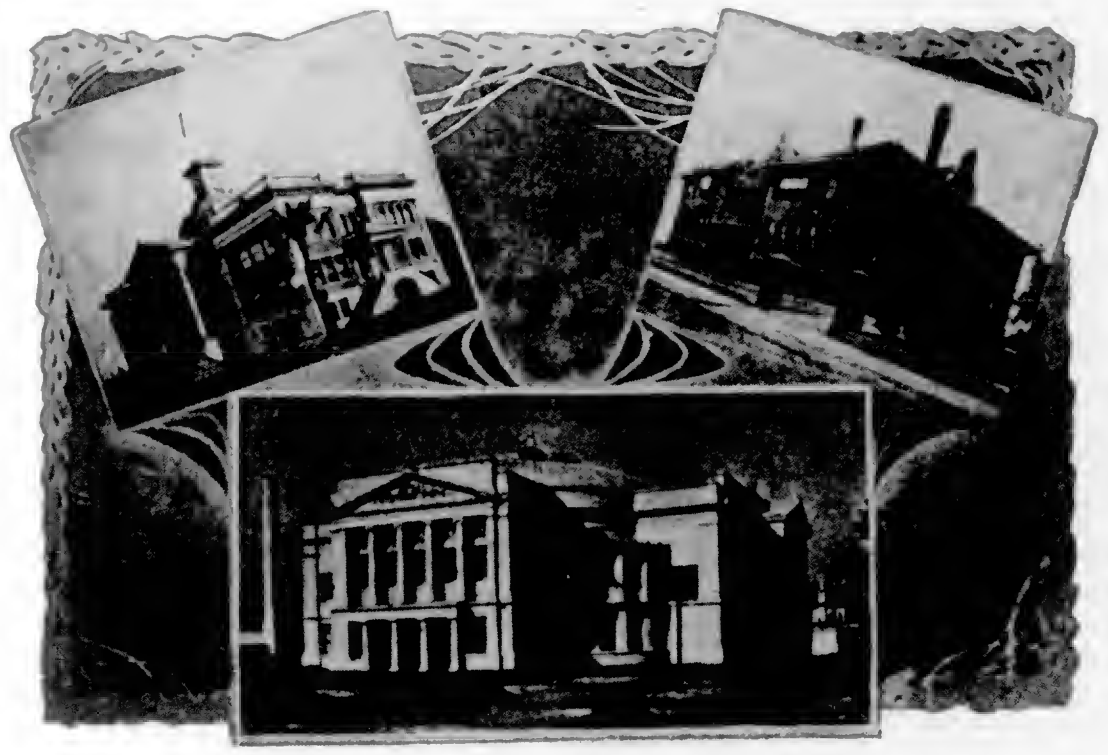

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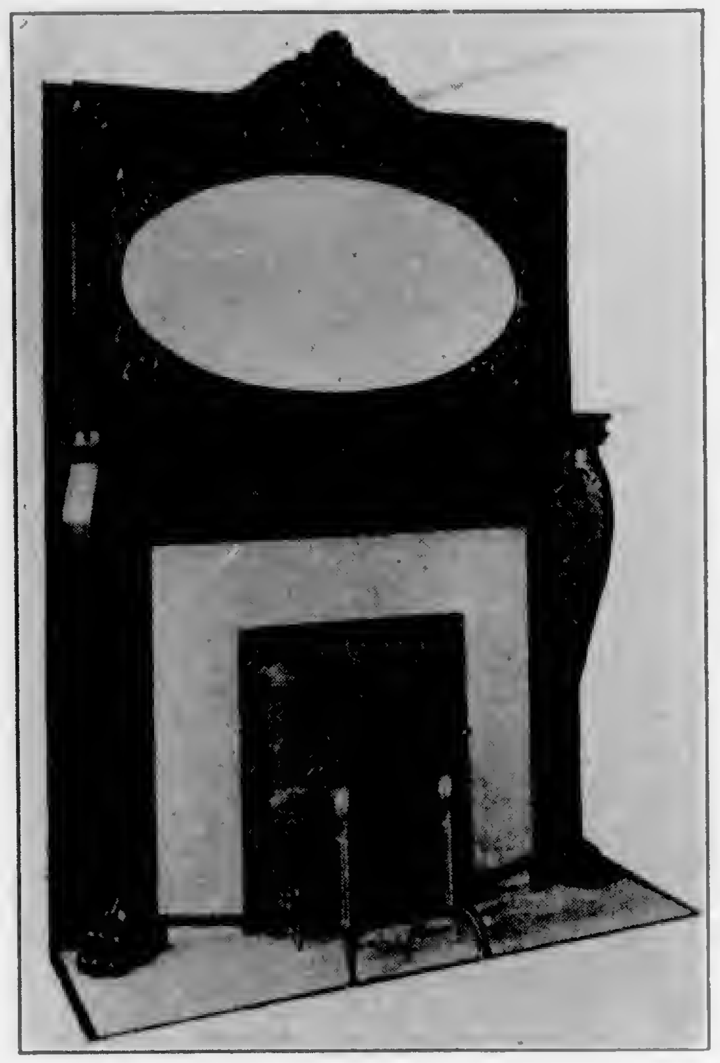

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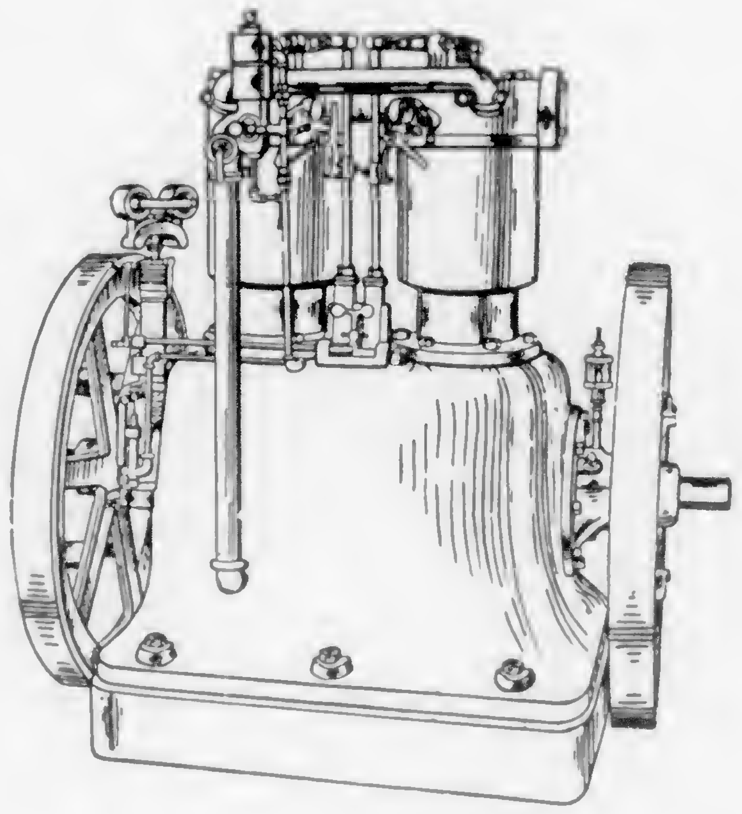

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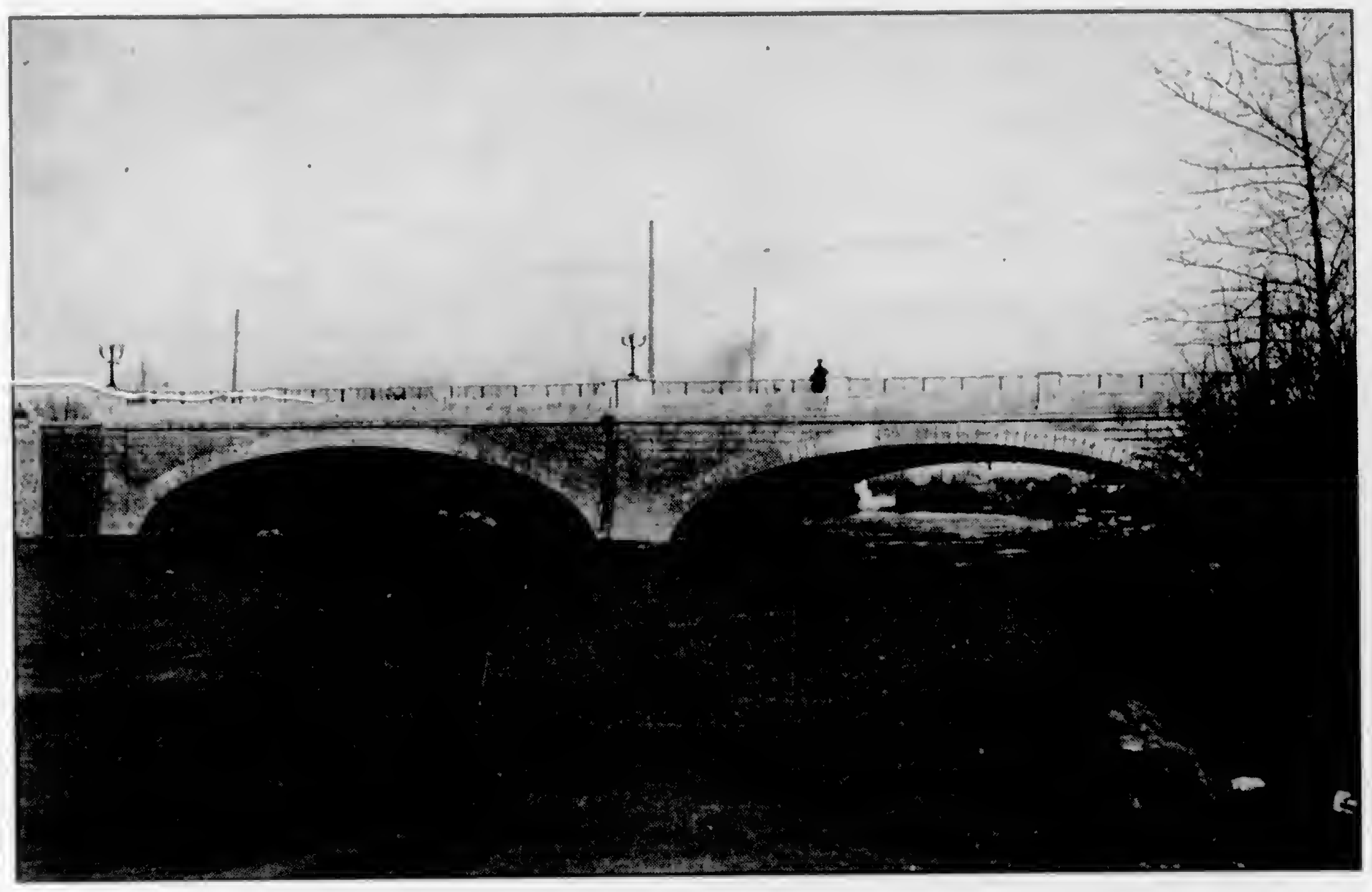

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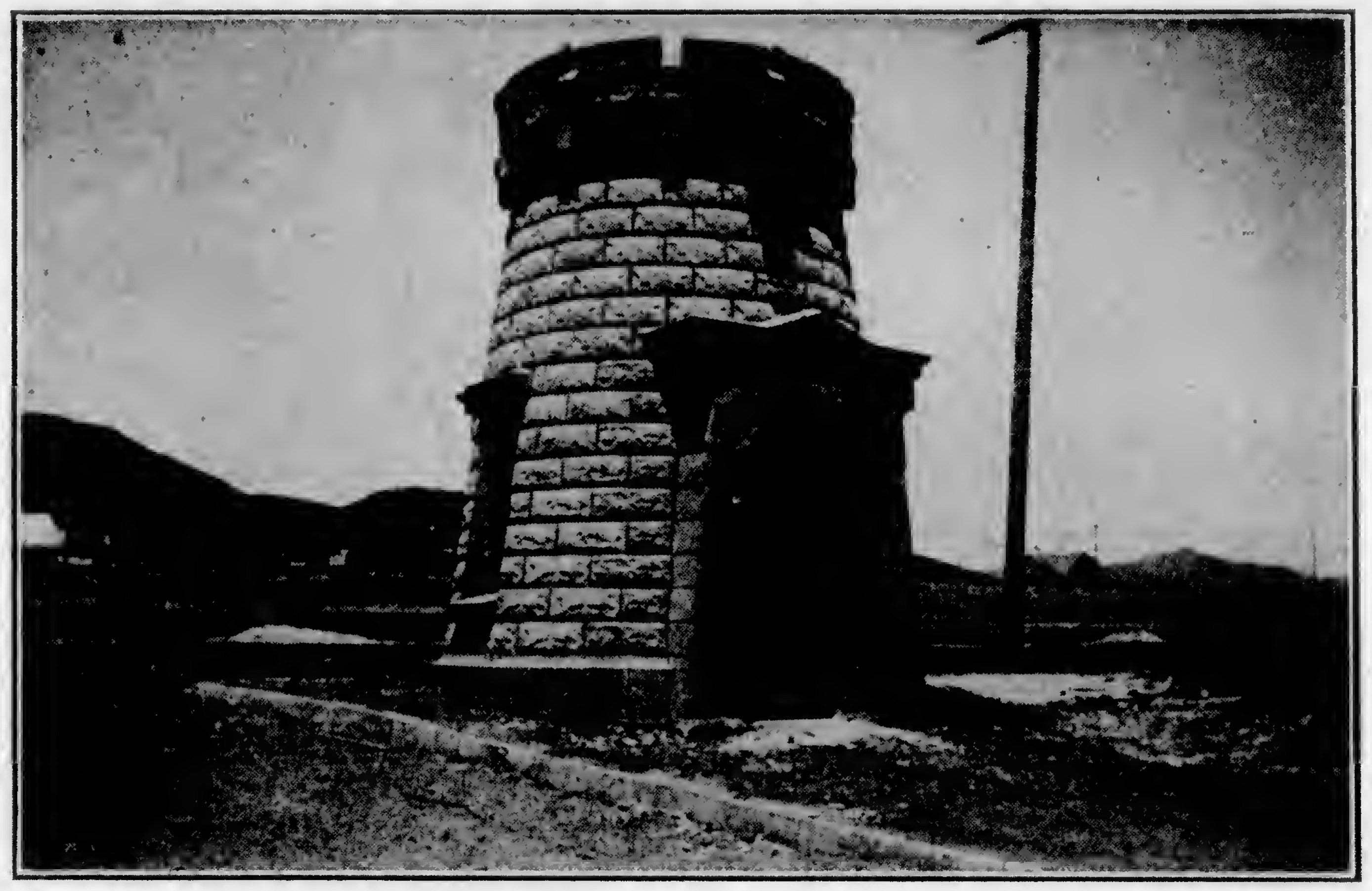

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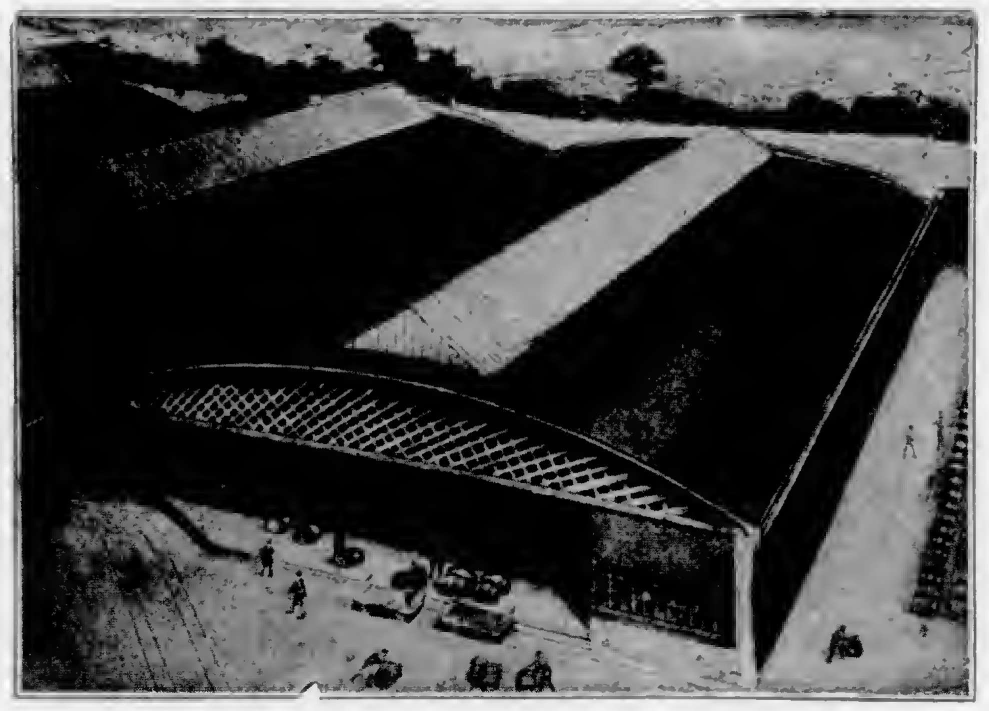

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An Index to the Advertisements

New Advertisers Not Noted Here Will Be Classified Next Month

Page
American Construction Co. ...101
American-Hawaiian Engineering Co. 11
American National Bank 105
American Sheet and Tin Plate Company 108
American Steel and Wire Co. .128
American Wire Fence Co.....127
Archer, Charles F. 90
Badger Chemical Extinguishers 12
Baker & Hamilton 3
Barker & Walsh............. 90
Barnes, W. F., Commercial Co. 113
Barneson Hibberd Co......... 13
Bass Hueter Paint Co...2nd Cover
Bay City Iron Works 110
Benicia Iron Works.......... 15
Bennetts Petroleum Burner Co. ....3rd Cover
Birk & Wegmann 106
Blume, C. A. 15
Boesch Lamp Co. 96
Bowring & Co............... 13
Breite, W. W................ 86
Breslauer, A. 122
Brittain & Co 14
Burnett, J. H., Iron Works .. 12
Burrell Construction Co. 3rd Cover
Cahill, James & Co...........117
California Art Glass Works .. 91
California Brick and Clay Co..105
Carnegie Brick and Pottery ..124
Clinton Fireproofing Co. 8
Chubbuck & Harris 123
Coles, Charles P. 13
Co-operative Artificial Stone Co. 121
Corwin, H. G................106
Couchot, M. C.............. 99
Cotton Bros. 4
Decker Electrical Co.......... 97
Demolith Co. 117
Dennison, A. S. 87
Dietzgen, Eugene 87
Dunlevey & Gettle 117
Empire Plaster 92
Enos Co. 95
Finn, John, Metal Works 114
Flexo Roofing 92
Freeman, I. 15
Galassi, T. V., Masonic Co.... 94
Gilley Schmid Co. 103
Girvin & Eyre 114
Gladding McBean Co. 8
Globe Brass and Bell Foundry 123
Grace, W. R., & Co. 91
Gregory Hardware Co. 123
Hardwood Interior Co. 118
Harron Rickard & McCone.... 8
Haskins, Arthur R. 12
Healy Gale Co. 13
Henderson, Walter 120
Page
Hendy, Joshua, Machine Works 97
Henshaw Bulkley & Co. 100
Hercules Gas Engine Works . 97
Hercules Manufacturing Co. .105
Hewitt Machinery Co. 87
Hipolito Screen and Sash Co. .112
Holmes Lime Co. 7
Holt & Habenicht...........120
Hoyt Bros. 110
Ingerson & Glazer.......... 121
Inlaid Floor Co.......... ...118
Inland Architect............110
Interlocking Stone Co. 126
Johns Mansville Co........... 88
Jurgewitz, J. Fred........... 94
Kehoe, William E............ 90
Keuffel & Esser Co...........107
Keystone Boiler Works...... 96
Klein, F.................... 93
Klein, John C...............125
Klippert, J. E...............117
Knickman & Nocenti......... 92
Leonard, John B......... ... 6
Lindgren-Hicks Co. 102
Levy Electrical Co............120
Lloyd, Gilbert & Robertson....112
Long & Hoyt...............112
Los Angeles Pressed Brick Co......................... 15
Machinery and Electrical Co... 2
Maldonado & Co.......3rd Cover
Manetta, J. E...............111
Mangrum & Otter............ 16
Marshall & Son..............125
McGuigan, John 93
McMahon, Ross.............109
McMurtrie, T. A............ 5
McNab & Rothchild..........106
McNear, Geo. W............ 93
Moller & Sons.......... ...120
Monash-Younker Co.......... 7
Montague, W. W., & Co...... 3
Moynihan & Co.............111
Nash, Carl Enos, Co......... 14
New Pedrara Onyx Co.......109
North American Dredging Co.. 11
Occidental Machinery and Engineering Co.............116
Otis Elevator Co.............104
Pacific Alamo Manufacturing Co.................... ...119
Pacific Blower and Heating Co. 109
Pacific Coast Art Marble Co..111
Pacific Coast Paper Co....... 5
Pacific Concrete Construction Co.........................125
Pacific Concrete Machinery Co.. 16
Pacific Construction Co....... 10
Pacific Fire Extinguisher Co... 2
Pacific Mantel and Tile Co.... 86
Pacific Manufacturing Co.....126
Pacific Paint and Varnish Co..122
Pacific Plymouth Plaster Co... 89
Page
Pacific Portland Cement Co. 1st Cover
Pacific Rolling Mills..... ...124
Pacific Surety Co.............110
Palace Hardware Co..........123
Paraffine Paint Co...........105
Parcells Safe Co.............120
Peerless Agencies Co.........114
Pettus, T. A........ 95
Ralston Iron Works.......... 12
Redwood Manufacturers Co... 94
Reed & Co..................128
Reilly, J. F., & Co...........114
Richards-Neustadt Construction Co. 125
Richter Mfg. Co..............111
Roberts Bros. Co............128
Roberts Combination Water Heater.....................109
Roebling Construction Co...... 16
Roebling, John A., Sons Co....118
Rulofson, A. C.............. 16
Russell & Erwin Manufacturing Co. 85
San Francisco Cornice Co.....103
Sarsi, O. S....... 89
Schwindelauf, C. W., & Co... 87
Scofield Co. 99
Skinner, Theodore H.......... 93
Smith Rice Co...............121
Solar Heater Co.......2nd Cover
Southern Pacific.............115
Standard Brass Casting Co...107
Standard Electrical Construction Co.......................100
Steger Electrical Co...... ...120
Steiger Terra Cotta and Pottery Works 96
Strong, Belden & Farr.......110
Sunset Lumber Co...........117
Tamm & Nolan..............122
Thompson-Starrett Co........ 98
Tibbetts Roofing Co.......... 99
Tozer, L., & Son Co.......... 88
Tucker, W. W...............124
Union Blind and Ladder Co. 103
Union Lime Co.... 117
United Railroads 118
Van Emon Elevator Co....... 1
Watson, W. J., Roofing Co.... 1
Wellington, George J........106
Westcott, C. A., Paint Co.....110
Western Building Material Co. 4th Cover
Western Builders Supply Co..103
Western Expanded Metal Co..110
Western Inspection Bureau...108
Western Iron Works........ 91
Western Roofing Materials Co. 90
White Bros.................114
Whittier Coburn Co.......... 14
Wieland, C. F...............110
Worswick Street Paving Co...107
Woods & Huddart...........101
Yates & Co................. 88

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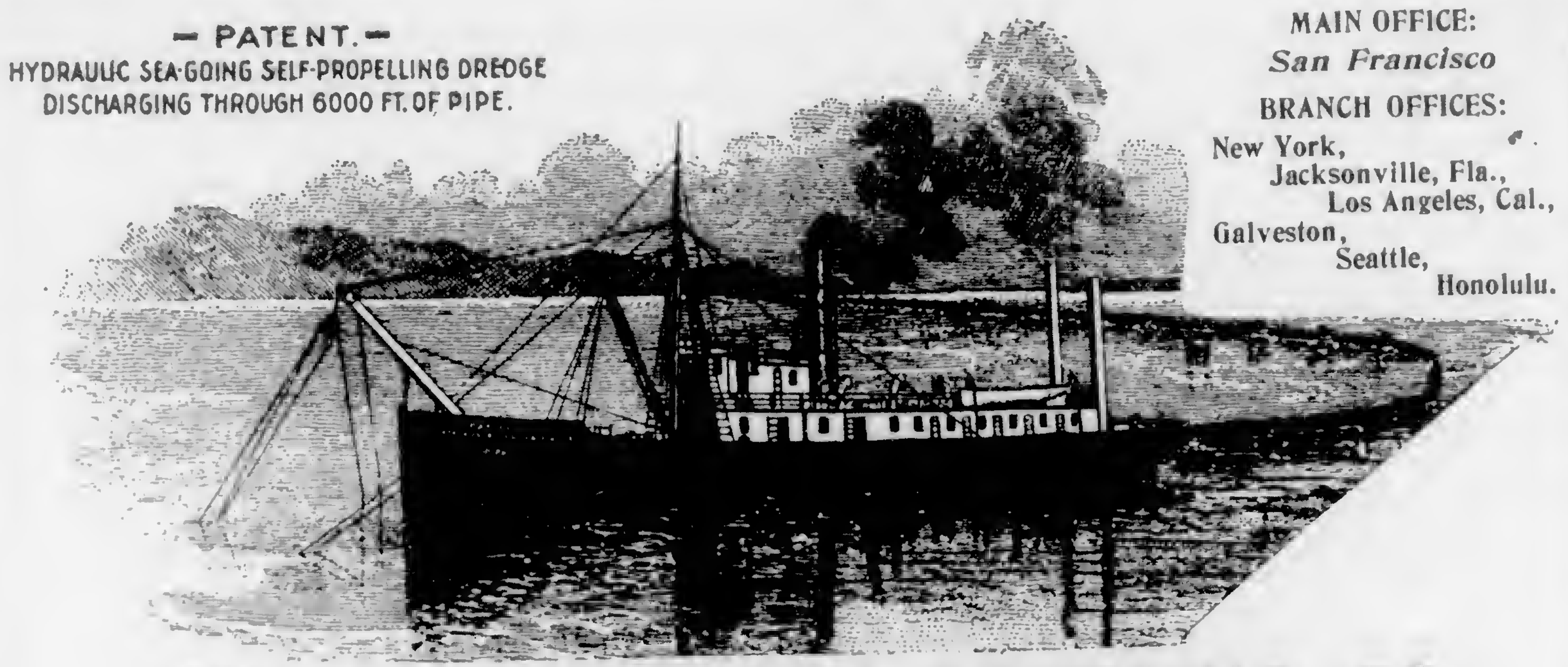

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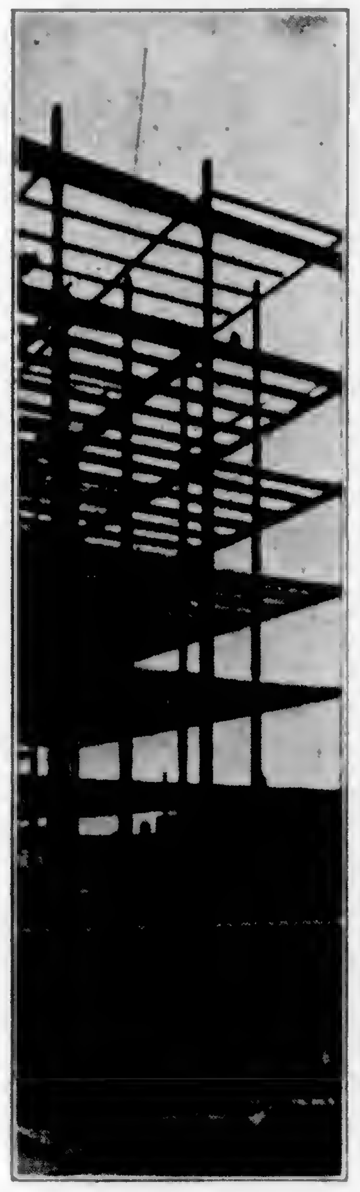

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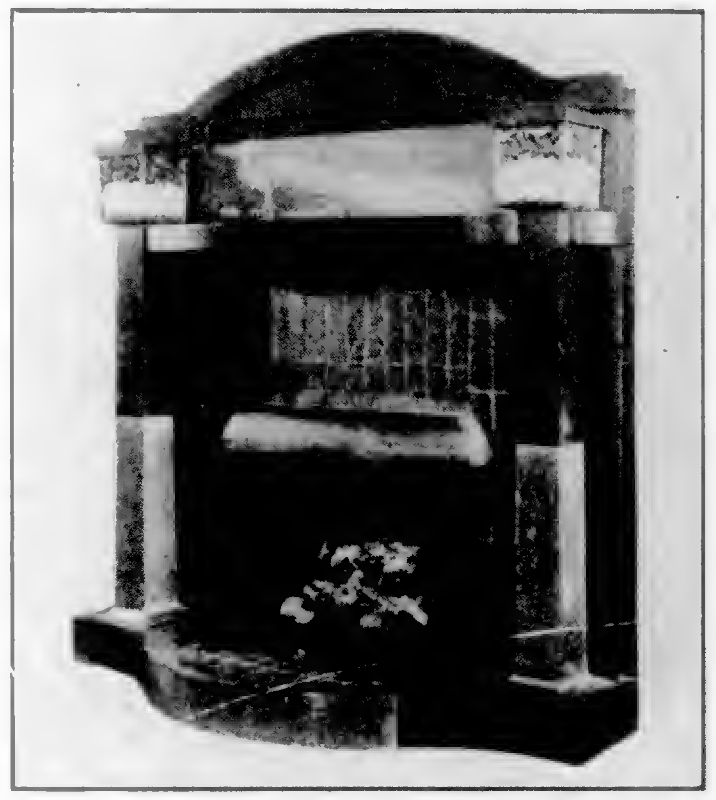

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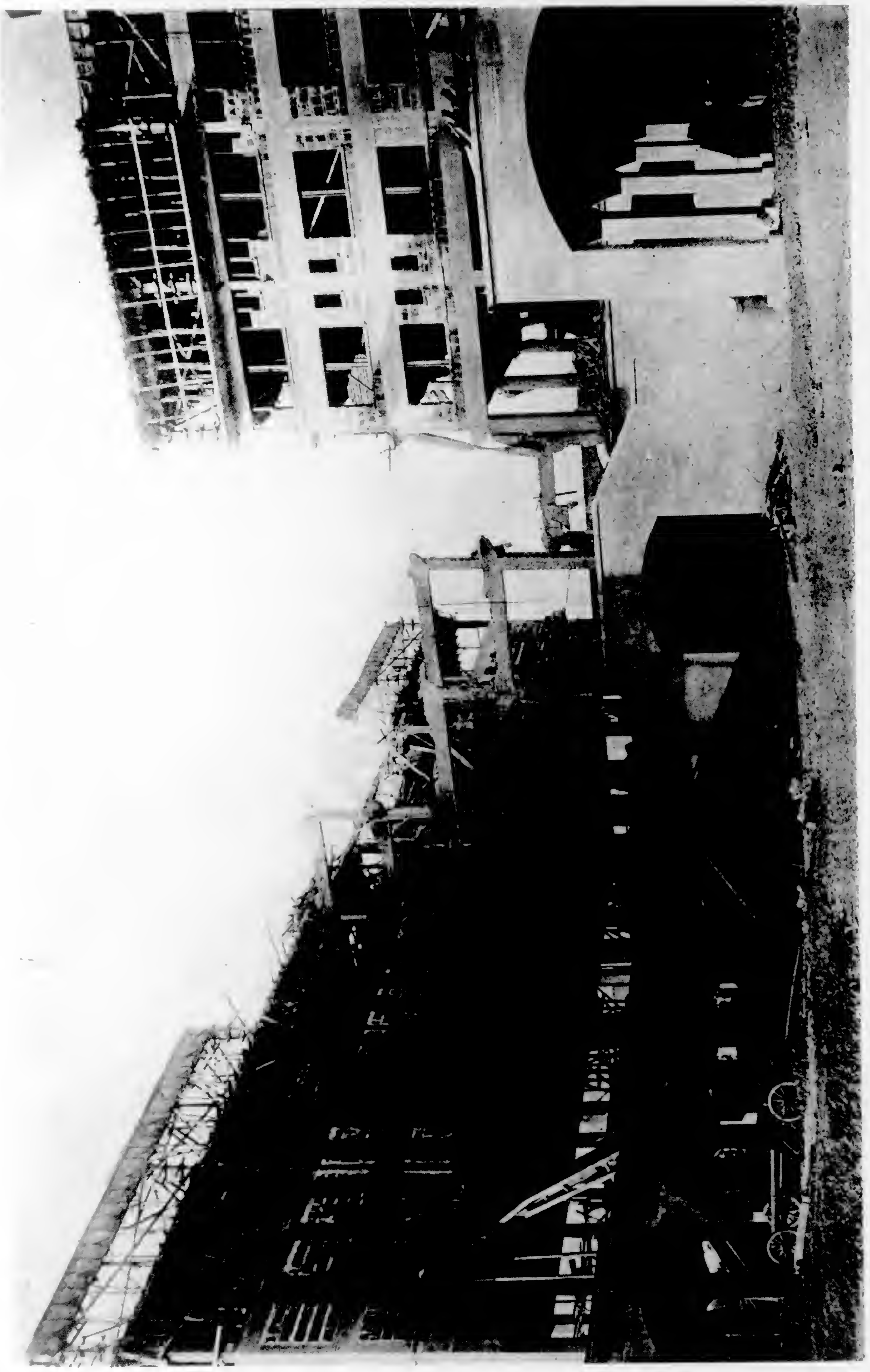
Contents for November

PAGE
Frontispiece—Front View of Bixby Hotel, Long Beach, after its collapse November 9th - - - 18
The Garden and the Bungalow - - - *William Knowles, Architect* 19
With Drawings and Photographs of Mr. Knowles' Work
A California Railroad Depot - - - 25
The Municipal Encouragement of Better Buildings - - *F. W. Fitzpatrick* 26
Competitive Plans for the Bank of Italy - - - 29
Government Buildings and the Tarsney Act, *William A. Newman, Architect* 40
Some Pointers on the Contracting Business - - - 41
Partial Collapse of the Bixby Hotel, Long Beach - - - 44
Specially prepared articles by Charles F. Whittlesey, Architect, John C. Austin, Architect, and others.
A Reinforced Concrete Office Building, *Benj. G. McDougall, Architect* 50
Terra Cotta and Brick—The Fire Side - - - *W. E. Dennison* 53
Enduring Brick - - - 54
Sand Lime Brick for Building - - - 56
Brick Bungalows - - - 57
Effect of Moisture on the Strength and Stiffness of Wood - - - 58
Clay (a Poem) - - - *W. E. D.* 59
Cement and Concrete—Development of the Cement Brick Industry, *C. J. Helm* 61
A Curious Accident to a Grain Elevator - - - 63
Progress in Design of Reinforced Concrete - - - 64
Painting Cement - - - 64
Heating, Lighting and Electrical Work—Fire Protection for Buildings - - *George J. Wellington* 65
The Proper Kind of Heating Apparatus - - - *T. M. Clark* 67
Interior Decorations—New Styles in Wall Paper - - - 72
The Brother of the Cross—A Story - - - *Burton Richards* 75
Advantages of Government Interests in Concrete - - - 77
Among the Architects—78
Editorial—82
Publisher's Corner—84



General view of the Bixby Hotel, Long Beach, after the collapse of a portion of the Building on November 9th. On the right the lack of supports under the fifth story can be seen. On the left a good idea can be had of the tremendous load this form of floor construction can carry after the concrete is matured little damage being done to the first floor.

THE
Architect and Engineer
Of California

VOL. VII. NOVEMBER, 1906. No. 1.

The Garden and the Bungalow

By WILLIAM KNOWLES, Architect

William Knowles, Architect

THE bungalow is a particular type of cottage architecture, that became popular about the time the English first occupied India. It was developed, as all styles are developed, by meeting the necessities of the situation. The hot climate demanded a roof that would give plenty of shade, and also allow the air that was stirring to freely circulate through the rooms.

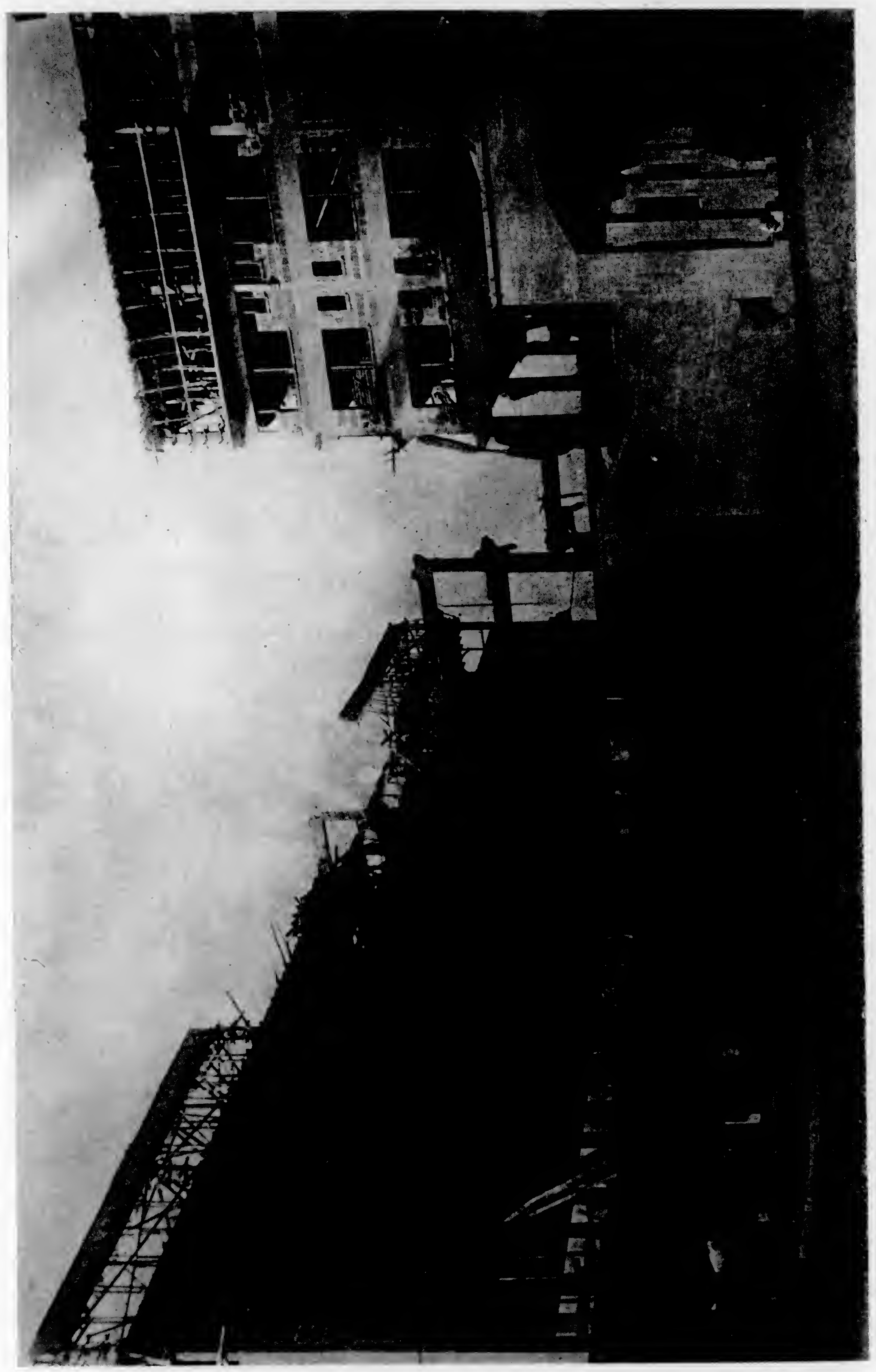
California climate is particularly adapted to the low, spacious, airy house. Here we may spend most of our days in our gardens, so that the garden and the house have become closely allied. There seems to be no distinction made between indoors and out, as most Californians live a free, unconventional life.

In the bungalow that generally pleases you will find that it has the effect of being low. The vertical lines are eliminated as much as possible, while all the horizontal lines are emphasized. These long, low lines never fail to give one the idea of rest, comfort, and a life free from strife. Our valleys suggested these things to the Mission fathers, who naturally gave expression to their feelings when they built their Missions.

Then the secret of building a successful bungalow is to keep it low. It matters little whether you have cedar shingles, plaster or rough boards for your outside finish, the first effort should be for good proportions; the detail and finish will follow easily.

You cannot spend too much time in studying over the plain surfaces or elevations of your little home. Strive to make its charm in its simplicity, rather than depend upon the jig-saw or plaster bracket for its beauty.

The porch is the feature of the plan shown with this article. It extends along the front and south side, and allows one to walk either from the living room



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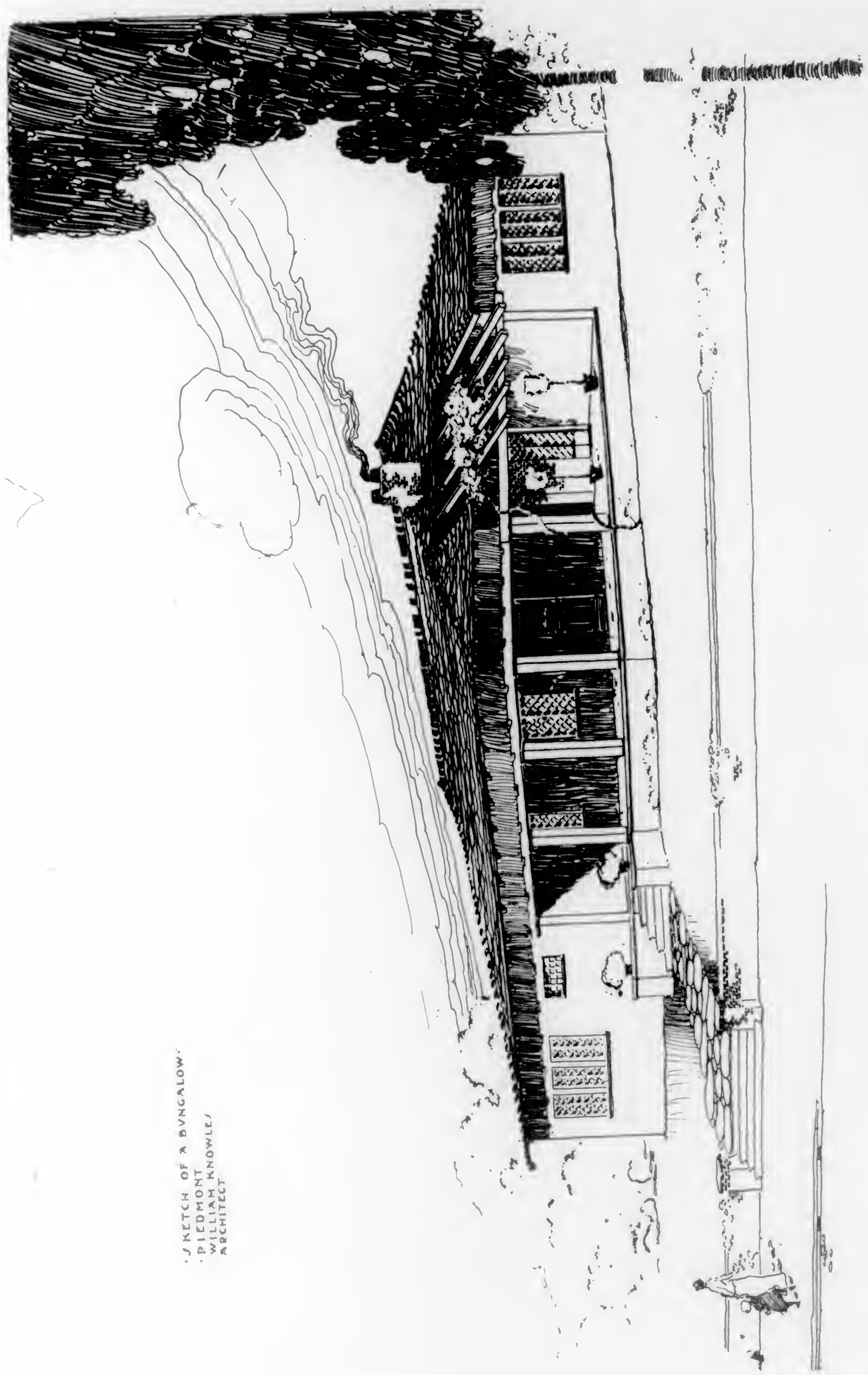
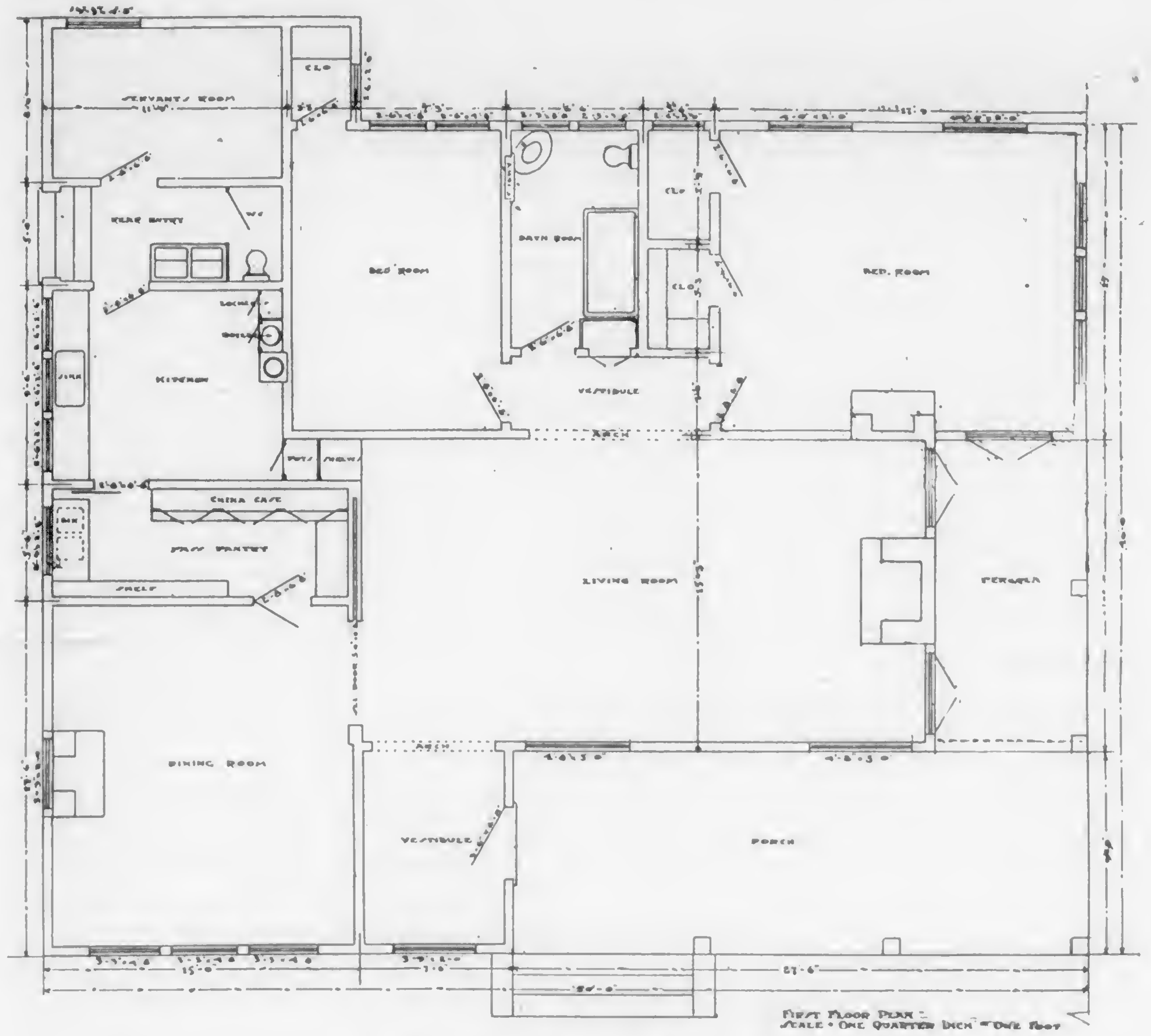


Sketch of a Piedmont Bungalow. William Knowles, Architect



First Floor Plan of a Piedmont Bungalow
William Knowles, Architect

or main bed room through French windows to the open air. The roof over the south portion of the porch consists of nothing but rough rafters, which will be covered with vines in the summer time, and will allow all the sun there is to flood the living room during the winter.

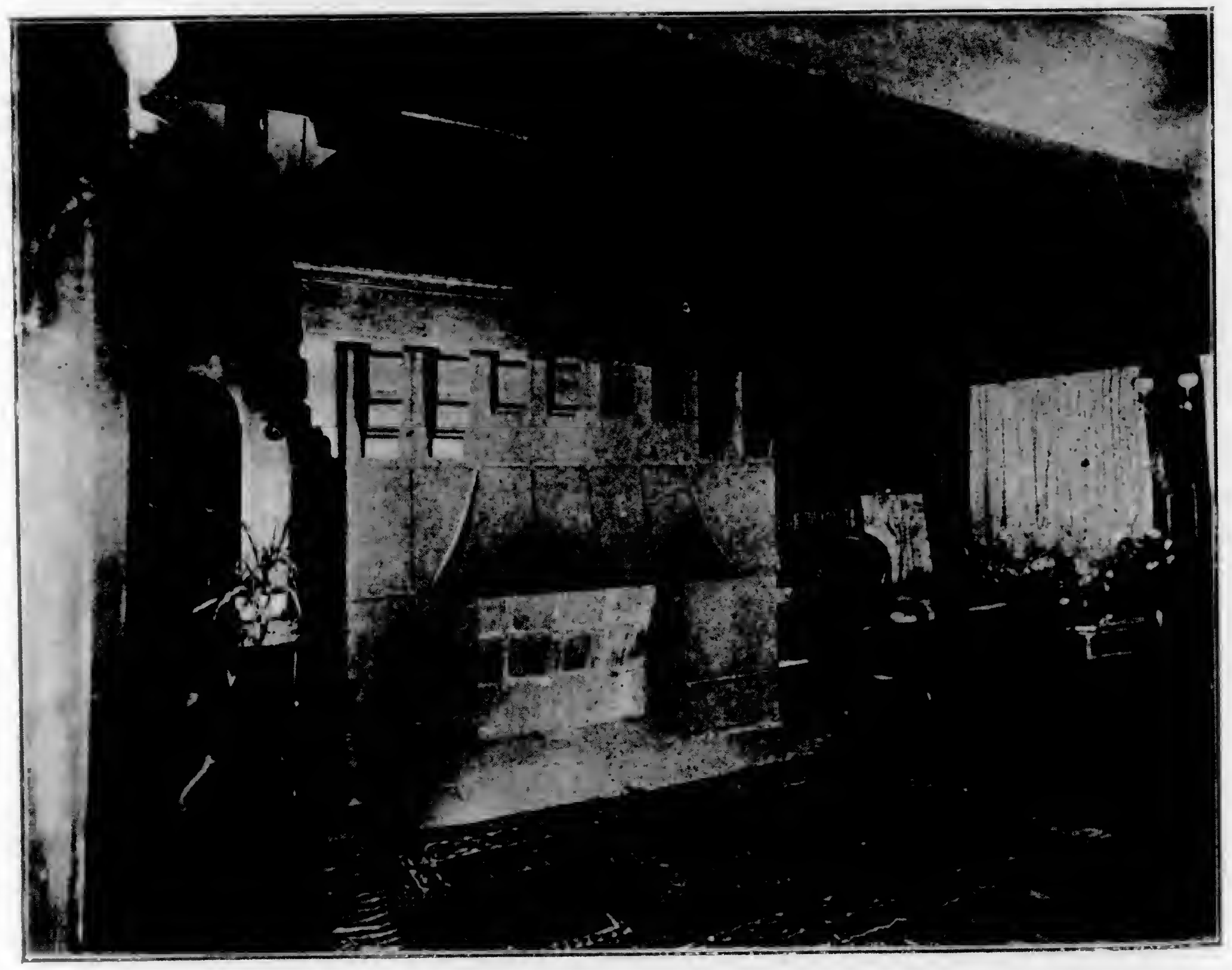
Instead of entering directly into the living room, a small vestibule is provided. Its purpose is to preserve the privacy of the home and protect it against the storms.

The large, generous living room, with the dining room opening from it, gives ample room for the entertainment of guests. The quiet welcoming fireplace that smokes cheerfully with its friends, tends to make you feel quite at home. The bedrooms are removed from the living part of the house by a small lobby. This lobby also serves to screen the bath, which is conveniently placed between the two bedrooms, and easily accessible from the main part of the house.

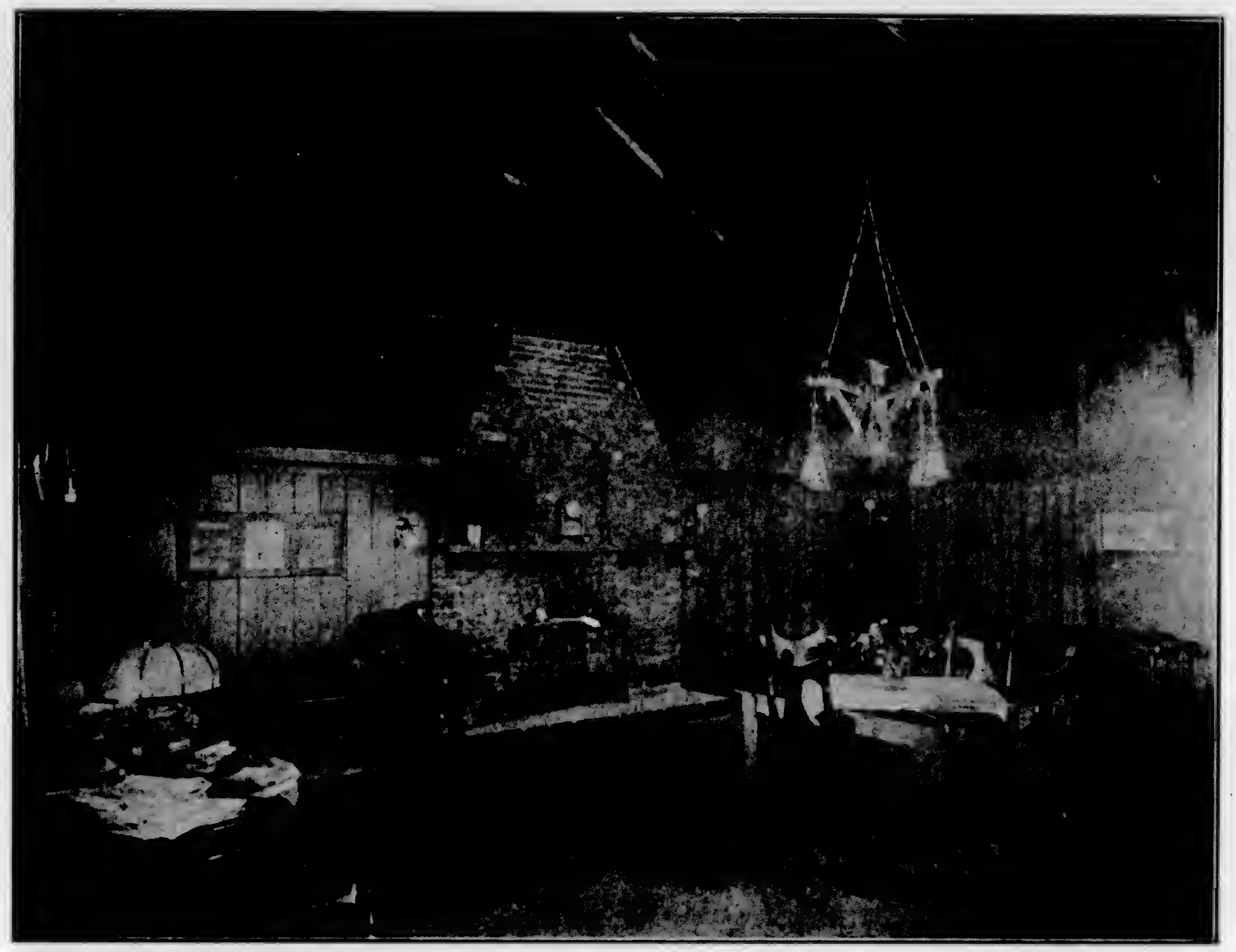
The kitchen and pantries are well supplied with accommodations for dishes, pots, pans, and bins. Beside the large bins for flour, there is provided four small bins for salt, meal and sugar. The rear entry is between the servant's room and the kitchen, and will also be used as a laundry.

All the outside finish is of rough lumber. The sides are of twelve-inch redwood boards, lapped about ten inches to the weather. The outside will be stained a dark sepia, with a white sash and a tile red roof.

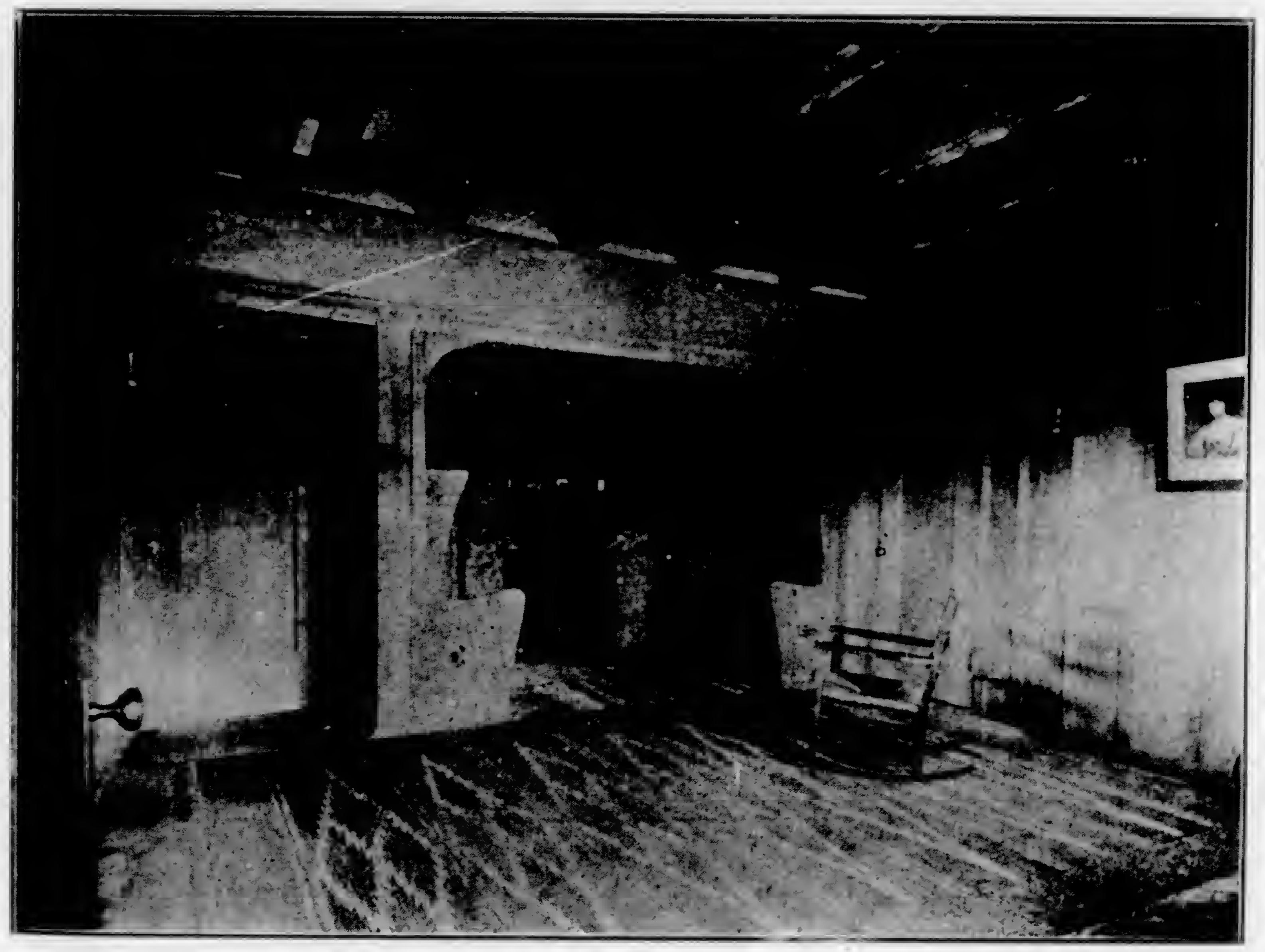
Bungalow of Mr. Bernard Ransom. William Knowles, Architect



Living Room in Bungalow of Mr. Bernard Ransom. William Knowles, Architect



Dining Room in Bungalow of Mr. Bernard Ransom. William Knowles Architect



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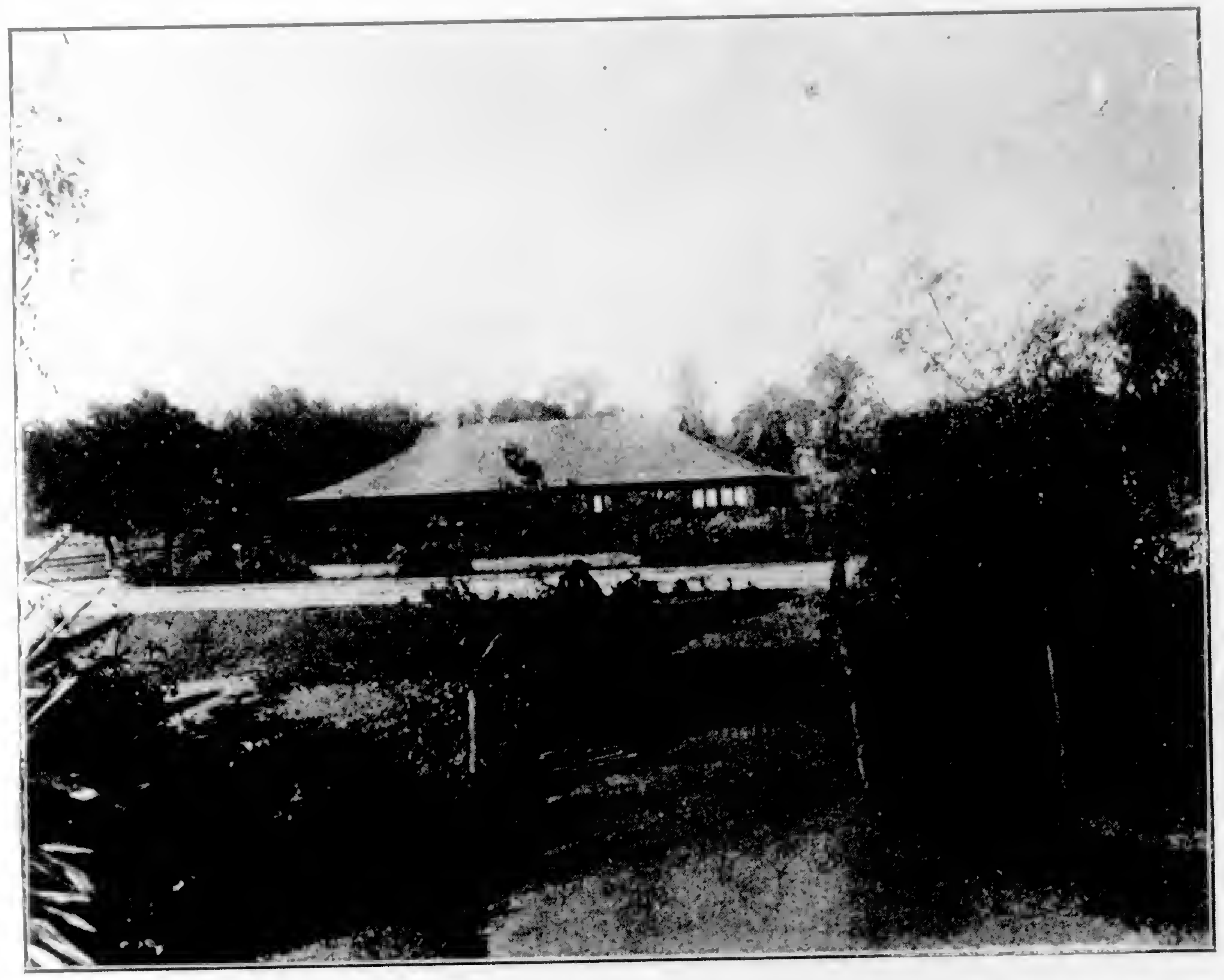

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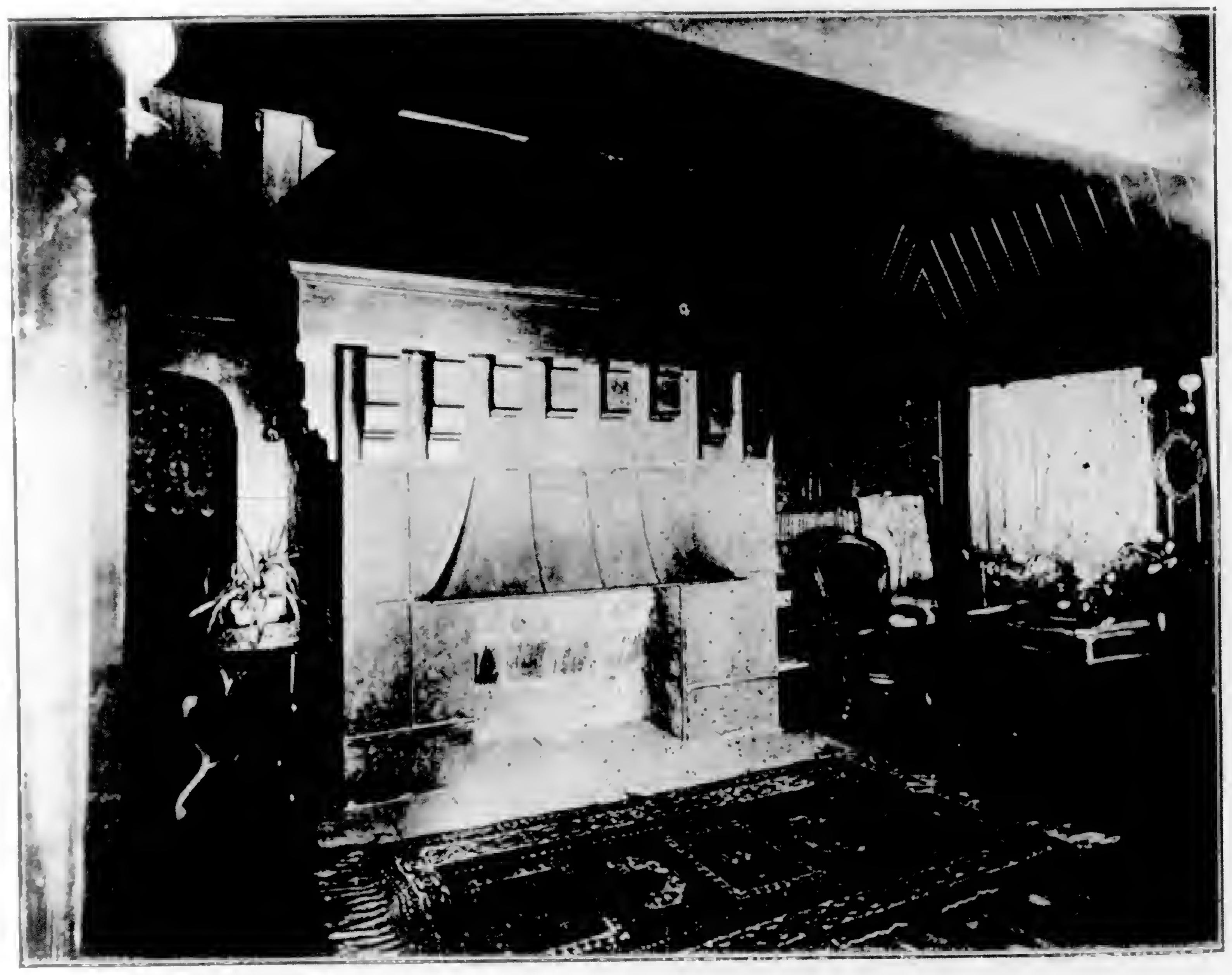

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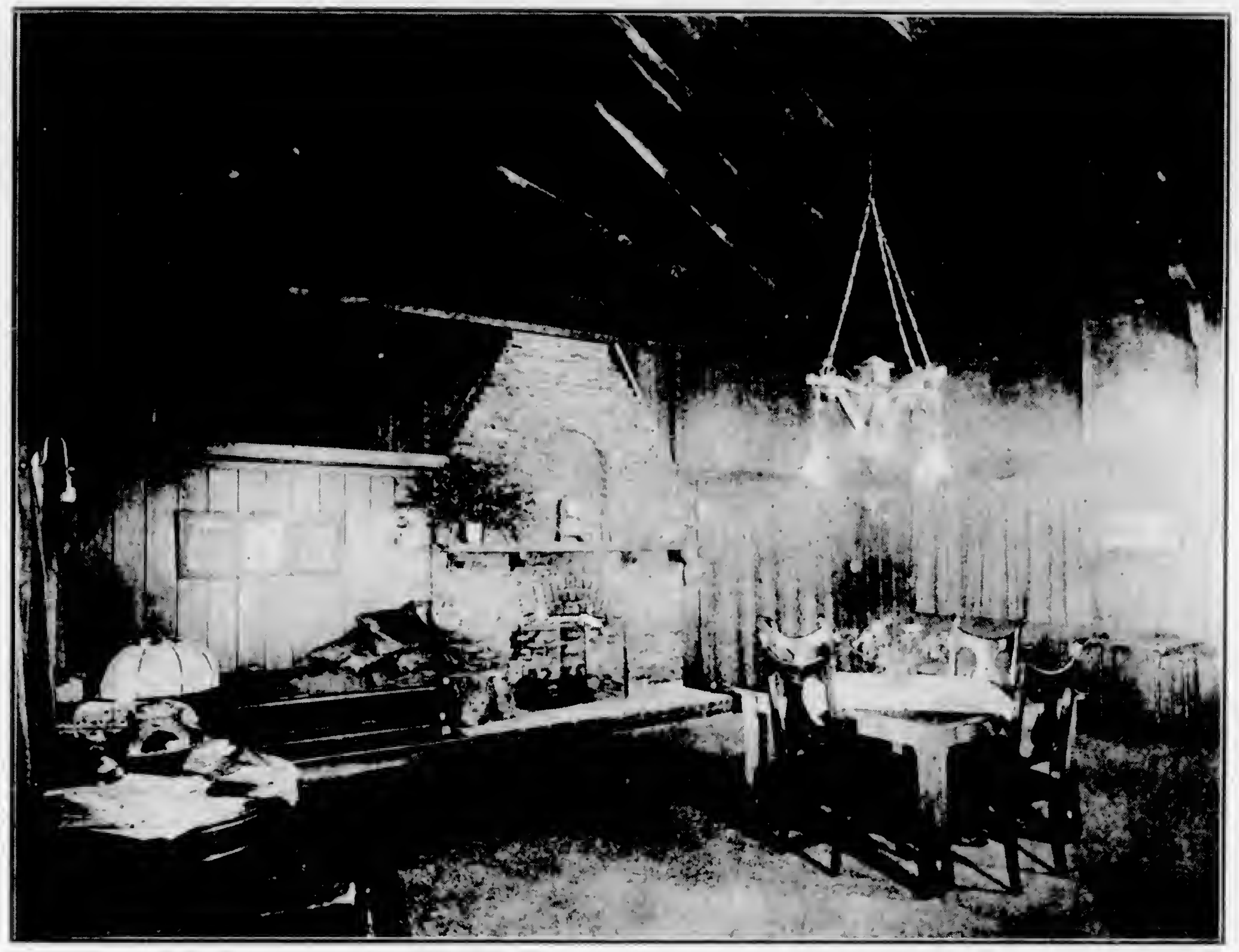

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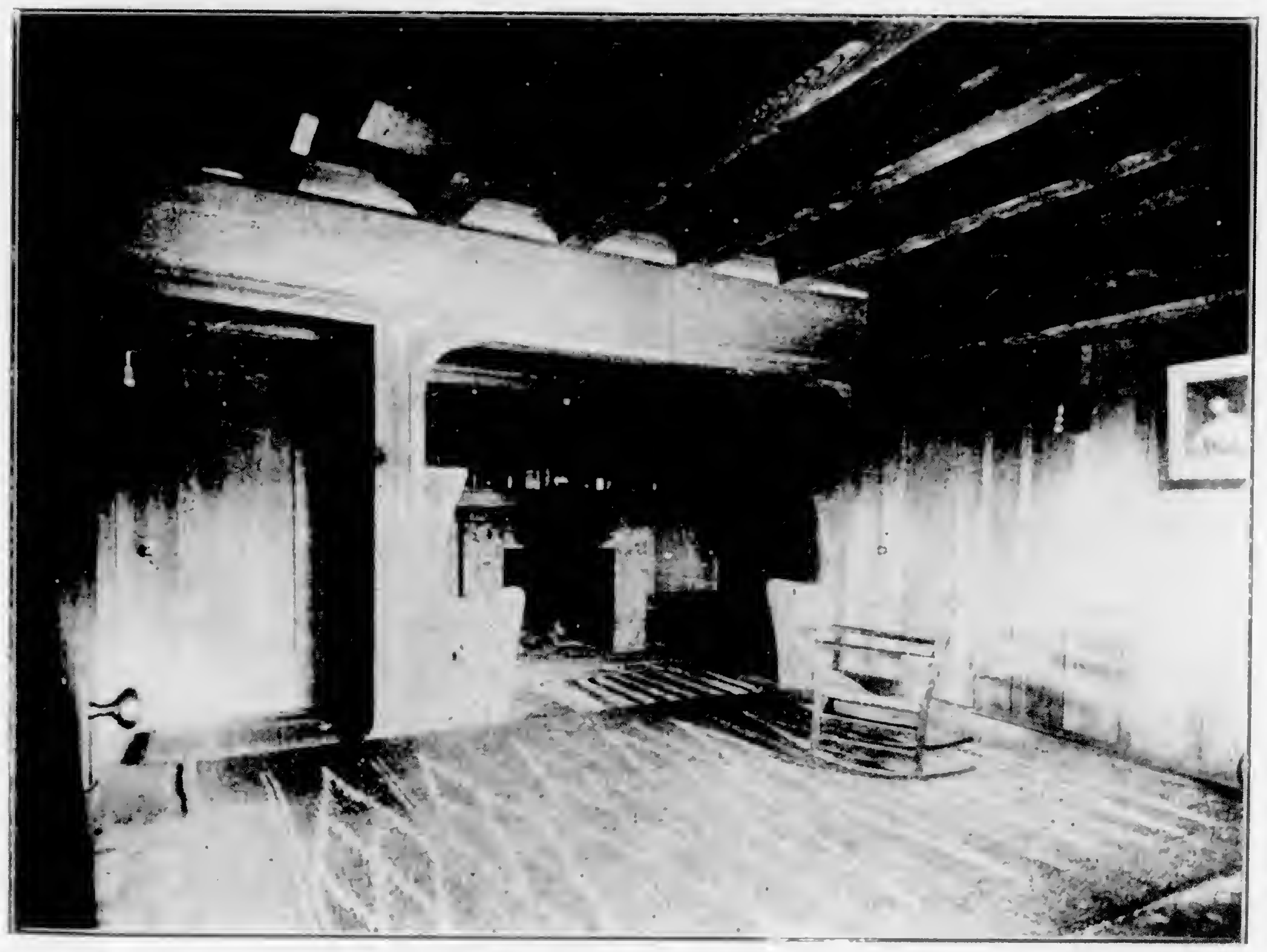
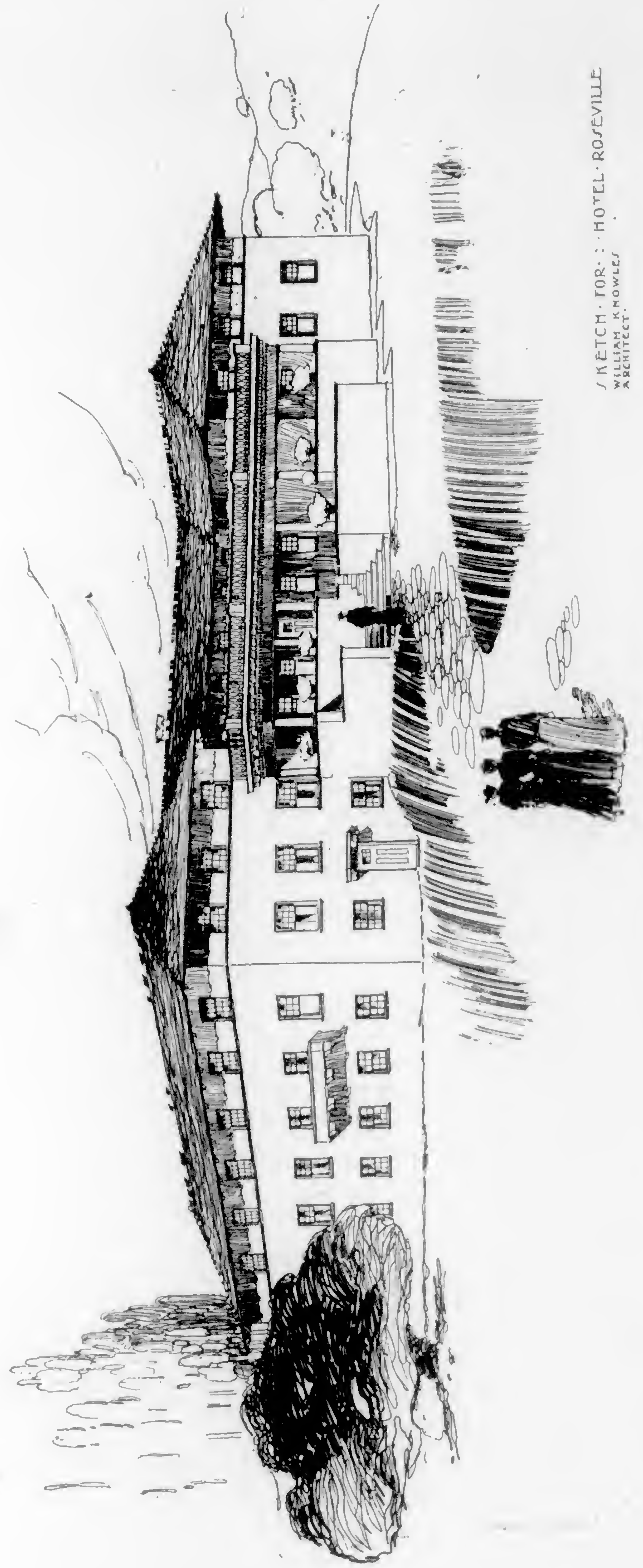
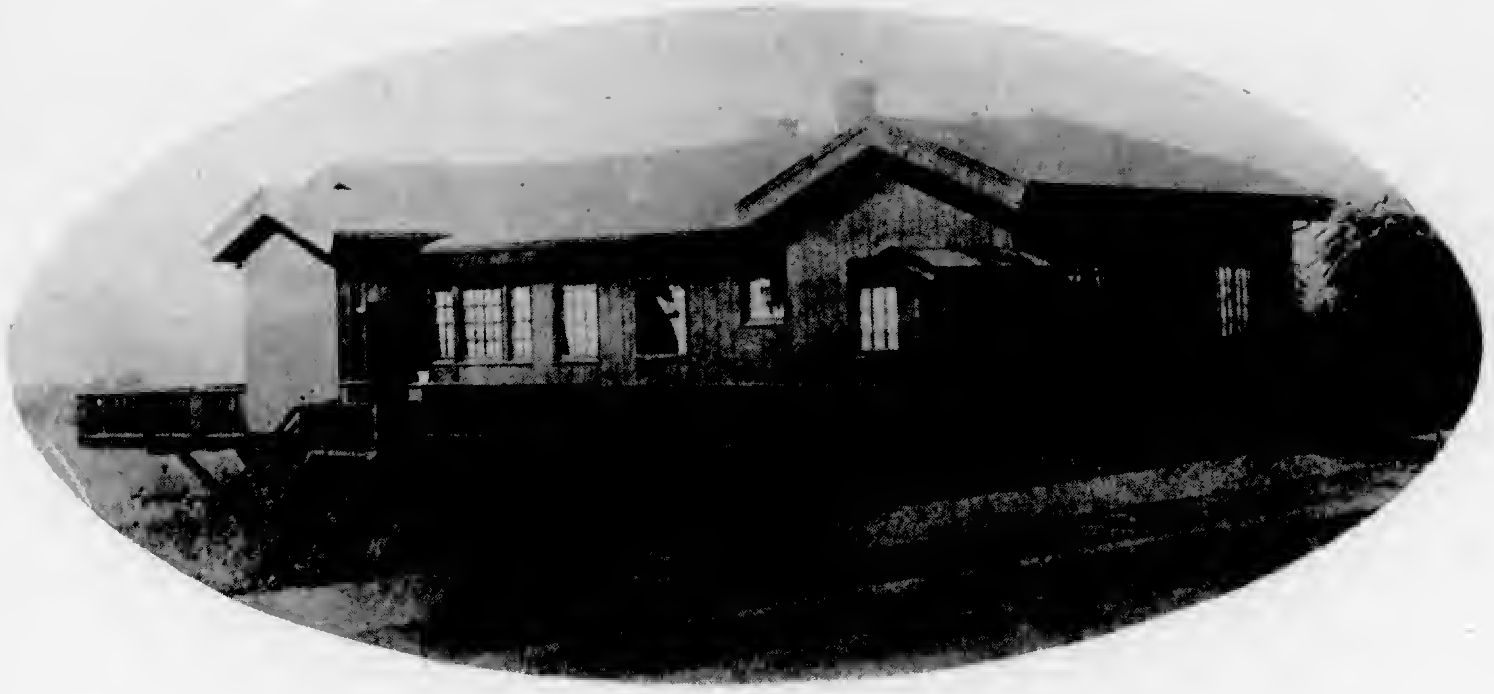


Living Room in Bungalow of Mr. James Ballentine. William Knowles, Architect



Sketch for Hotel Roseville. William Knowles, Architect



Bungalow of Mr. James Ballentine
William Knowles, Architect

There will be little or no wood finish in the interiors, the desired effects will be obtained by carefully selected papers. The picture mold will mitre over the heads of doors and windows, forming a very effective and inexpensive cap.

The bedrooms, bath and kitchen will be done in white enamel. The bath and kitchen wainscot will be of metile, marked off in small squares. These small bungalows grow in interest as the garden and vines obtain a more luxurious growth. The effect of age, with its quiet low tone, can not be had without the help of nature. Each year finds the garden and bungalow more closely drawn together.

* * *

A California Railroad Depot

The Southern Pacific Railroad Company is preparing to build a new depot at Berkeley, which will be especially designed to harmonize with the college architecture in that city. The building, of French Renaissance, consists of two main sections connected by an arcade. It is 190 feet in extreme length and 41 feet wide. An arcade 11 feet wide extends along the entire west front and both ends of the building. It will be constructed of red pressed brick, with light buff terra cotta trimmings and copper roof and cornice. The arcade is in the Doric order, made of reinforced concrete covered with terra cotta. The entablature and pediment carry out the same color scheme. The north wing of the building contains a smoking room, baggage room, etc. The south wing contains the waiting room, retiring room and ticket office. The interior of the waiting room, which is 45 x 25 feet with a 23-foot ceiling, is to be finished in light buff brick with terra cotta trimmings and to have an elaborate terra cotta fireplace with an ornate hammered copper hood at one end. The walls of the waiting room will be finished in paneled designs by a famous sculptor, executed in terra cotta by California manufacturers. The wood finish throughout will be of Eastern oak; special designs in electric light fixtures will be introduced. Between the two wings of the building will be a grass plot surrounded by an ornamental fence, cement walks, etc. The surrounding grounds will also be laid off with lawns and cement walks.

The Municipal Encouragement of Better Building

By F. W. FITZPATRICK

SAN FRANCISCO has been sorely tried, cruelly wounded, indeed, but her people have given the world splendid evidence of American grit and stamina. During the trying days they behaved splendidly, and since then have we had many an occasion to congratulate them upon their magnificent recuperative powers and the unity and virility of their efforts and success in re-establishing order out of chaos and the foundation of a still greater city. We hear some lament anent the flimsiness of the temporary buildings that have been permitted to go up, but we realize the craving one must feel for shelter, the urgency of the case, and would not blame your people if they insisted upon erecting merely tents instead of the wood and galvanized iron shacks that are being built by the thousand. It would have been an insufferable hardship to have insisted upon better construction. But the authorities should have made some restriction, so that there would be swathes of open spaces around more or less limited areas—in other words, four or five blocks of temporary buildings should have been permitted, then an open space all about, and then more temporary blocks. As it is, if fire once secured headway again, it would mean the total destruction, not only of these cheap buildings, but of costly stocks. Fire occurring in several places at once, thus cutting up the efforts of the brigade, would be exceedingly hard to manage, and San Franciscans, of all people, must be impressed with the possibility of almost any imaginable accident.

But the question of fire in these temporary buildings is not the one I wished to write about in these brief notes, important though it be. Nor will we say much about the certainty that many of those "temporary" buildings will become more or less permanent fixtures, a source of anxiety and danger, a menace to the entire city, and the cause of very considerable additional expense being incurred in making surrounding permanent buildings more fire-proof than they would have to be were it not for this menace. The matter I have in mind at the present moment is the splendid opportunity San Francisco has to encourage her citizens and help them to build their permanent buildings well.

The State or municipal government has been exceedingly punctilious about enforcing the laws that define the duties of the individual toward itself, but it has somewhat tardily recognized its obligations toward the individual. The awakening has been with a sort of start, and we have gone to the extreme that some people have fairly turned purple in calling us rampantly "paternalistic." We have enacted laws relating to health, wise sanitary measures, others looking to the comfort, the liberty of the individual; we even legislate now to the end that nothing but pleasant sights shall be seen by the individual at least in our streets. We eliminate deformed and repulsive beggars, projecting signs, cattle, noisy vendors, etc. The State steps in and, to a degree at least, prevents one or a combination of men from fleecing or extorting from the individual. It educates his children, carries away the refuse from his house; it cares for the sick, the very poor, the aged. But its tendencies, an hereditary trait handed down from medieval times, are still to take hold of things as a sort of last resort—efforts towards cure seem to be more natural to it than anything in the creative way, or prevention of troubles. In so many things the State does literally the amputation that, alas, is all too frequently necessary, and spends vast sums in that amputating while insignificant expenditures would have been all that was necessary to have prevented the evils that made the amputation necessary. Talk of consistency! We spend millions in prisons, hospitals, poorhouses, and such institutions, while we are niggardly indeed with our school funds, health boards, and other preventive agencies, that, if properly and more liberally handled, would reduce by half or more the expenses incurred for the cure.

So with fire, the municipality spends millions in alleged fire protection, but when you suggest the expenditure of five cents for municipal fire-prevention, why, the authorities look at you askance and feel certain that an attempt is going to be made to rob the till. One thing could be done, however, a splendid preventive measure, that would not cost the municipality one cent and that would, in time, cut off a very large percentage of the expenditure now incurred for fire cure. One of the city's most sacred rights is the imposition of taxes, a lien against property that takes precedence of all else, a sacred and inalienable right, but, in heaven's name, is there any reason why that right should not be intelligently exercised?

As things are now, if a man, besides being business-like and appreciative of his own welfare and the security of his property, is public-spirited enough to build well and refrains from making his property a source of danger to that of his neighbor, a source of anxiety and expense to his city, and puts into that building in the way of fire-proof construction and general betterment a much larger sum than what indifferent existing laws we do have compel him to, why, the assessor comes along and says that the total value of that building is so much, including the cost of those aforesaid betterments, and, therefore, the man's taxes must be so much—a fixed per cent that is the same all around—so that the man is not only taxed upon the value that he may be expected to get out of his property, but is taxed upon the additional amount he has already taxed himself pro bono publico, and, unnecessarily, from some viewpoints—a compounded affair; inequitable, unjust!

That man has built well enough that there is but little danger of his property being much damaged by fire or of its being the cause of damage to adjacent property. That building of his will not give any work to the fire department. Indeed, he could get along without that department. Salaries and cost of apparatus, etc., constitute a very heavy item of city expenditure—a goodly share of our taxes go to the defraying of that expense.

The other man, a sort of Buddenseick, builds a tenement. He and his architect labor with the building department to secure exemptions; they "skin" the building everywhere they possibly can. The safety of the property is not the question. The one thing is to get the very greatest return possible in rents. Those rents will be high enough so that he can afford to pay the pretty stiff rating the insurance companies mulct him; if the building burns down, why, they will pay him for it; if any lives are lost, why, that is none of his business. The city wishes to protect life, however, and, perhaps, additional ladders and other provisions are made so as to safeguard that very building; the fire department watches it very carefully; it is one they are sure to be called to, sooner or later. The assessor comes along. The property is worth so much, and it is manifest, even to him, that it was built very cheaply; the total investment is small, howbeit that the danger is great, and Mr. Man is assessed on his cheap to him, but expensive building to his city, at just exactly the same rate as the other man.

What justice is there in that?

How much better, more just and equitable, and what an encouragement it would be to good building if taxes were on a sliding scale, arranged according to classes of building—class A, class B, and so on. The minimum rate assessed against the very best buildings, those well-built and in which every precaution is taken to prevent fire, and the very maximum tax levied against old fire-traps and buildings that are a menace to all about them and on account of which nine-tenths of all our great expense for fire-protection has to be incurred.

It would not only encourage better building, but it would be a very great incentive to the general improvement of property and the elimination of old rookeries in cities.

The insurance companies could do as much for us as this proposed system of taxation. They could make their rates on poorly built buildings prohibitive, so that a man would have to build well. But they have not the public weal at heart. We cannot expect them to do anything public-spirited. Insurance companies are managed for private gain. Insurance is essentially a gamble, and there will be no remedial rates established as long as there is any possibility of the companies winning out in that gamble. Besides, when a great disaster occurs, as at San Francisco, why, they can repudiate the claims against them, or fight them, or "settle" them. Or they can go out of business, or they can raise the rates slightly all over the country, and it is such a vast country that they can soon refund themselves for such a colossal loss as even that of San Francisco.

No, we need expect but very little from the insurance companies. The cure lies in the direction of the reform of municipal taxes. That reform would not be very difficult, and it would soon be brought about if people would only wake up to their own privileges, and rights, and advantages, and insist upon them. The municipality exists for and by them; why have they not sense enough to do that governing—their own governing right?

We have harped on this reform in taxes for years. How hopeless it almost seems to secure anything of that kind and how one has to literally fight himself to not repeat what a great capitalist once said about the dear people! It is only by persistent and never-ending hammering that we *have* secured any reforms in the past, and, trying as it is, we will keep on that hammering in this matter, too, until something is accomplished. Our people have not been responsive, as I say, but that the suggestion is a practicable one is proven by the fact that Paris, quick at realizing the possibilities of any suggestion, whether from its own people or from abroad, has adopted this idea and has it in successful operation. More than that, it has gone a step farther, and is encouraging the beautifying of its buildings, as well as their proper construction. It actually awards prizes to the architects of its most beautiful private buildings and remits a certain percentage of taxes to the owners of those buildings for having "taken steps to assist in making of it the most beautiful city in the world."

I suppose if we should suggest such a system of prizes, as well as remitted taxes, there would be those who should fairly shriek "paternalism!"

On the following ten pages will be found
The Competitive Plans for

THE BANK OF ITALY

SAN FRANCISCO

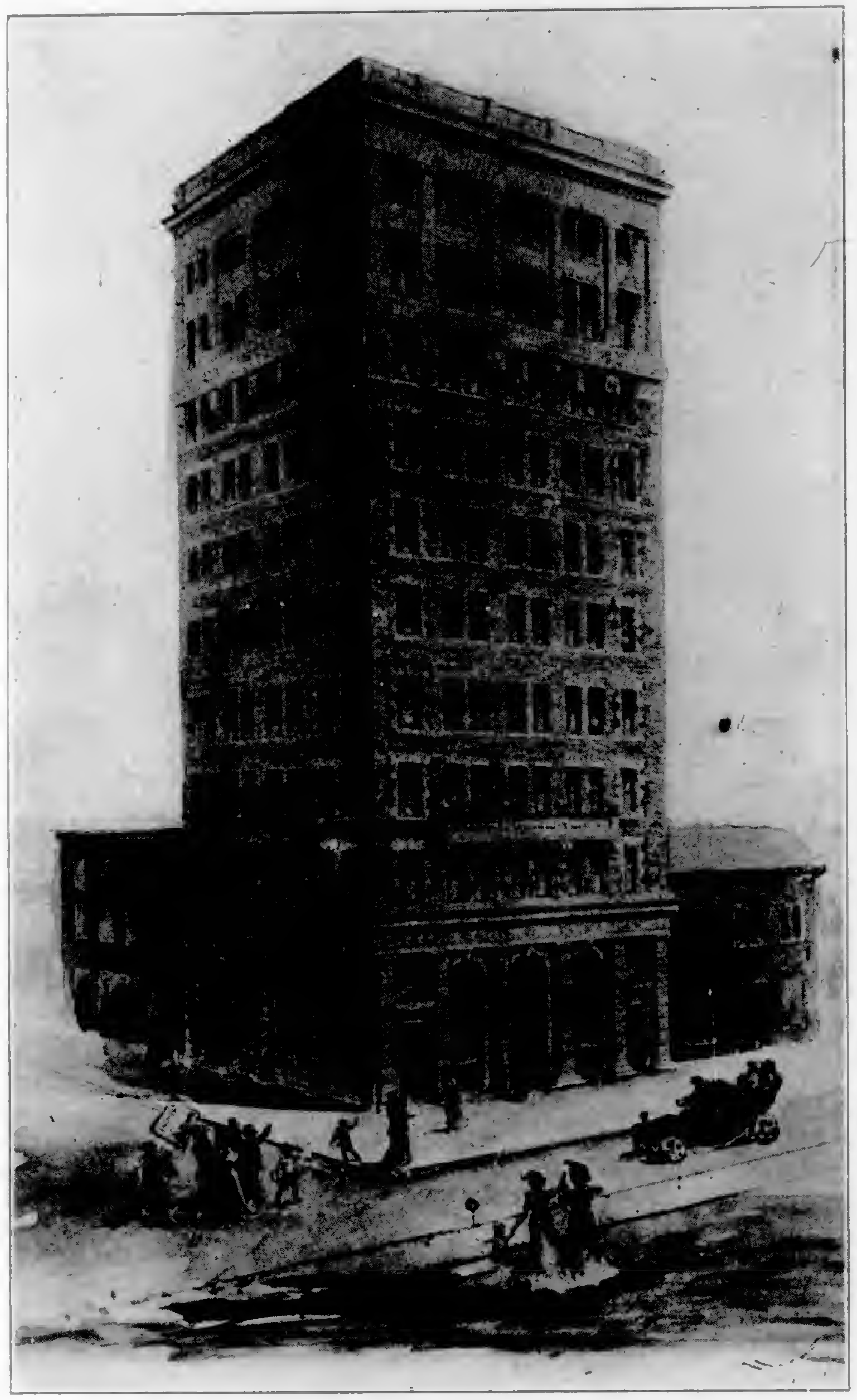
◆

As presented by Architects

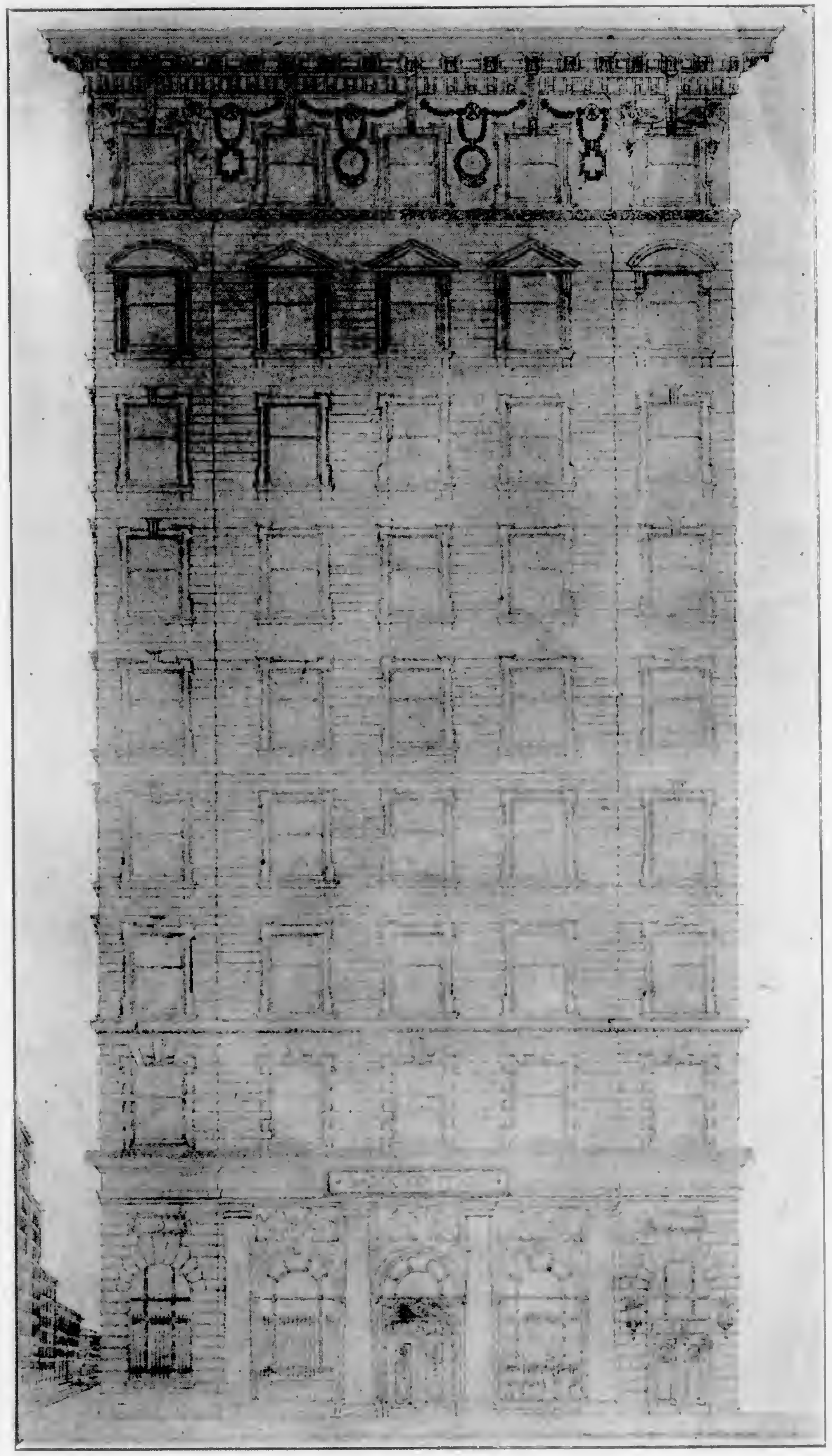
Frank T. Shea
Ralph Warner Hart
Sutton & Weeks
L. Mastropasqua
Charles Paff & Co.
Stone & Smith
Loring P. Rixford
William Mooser & A. M. Milwain

CONDITIONS:

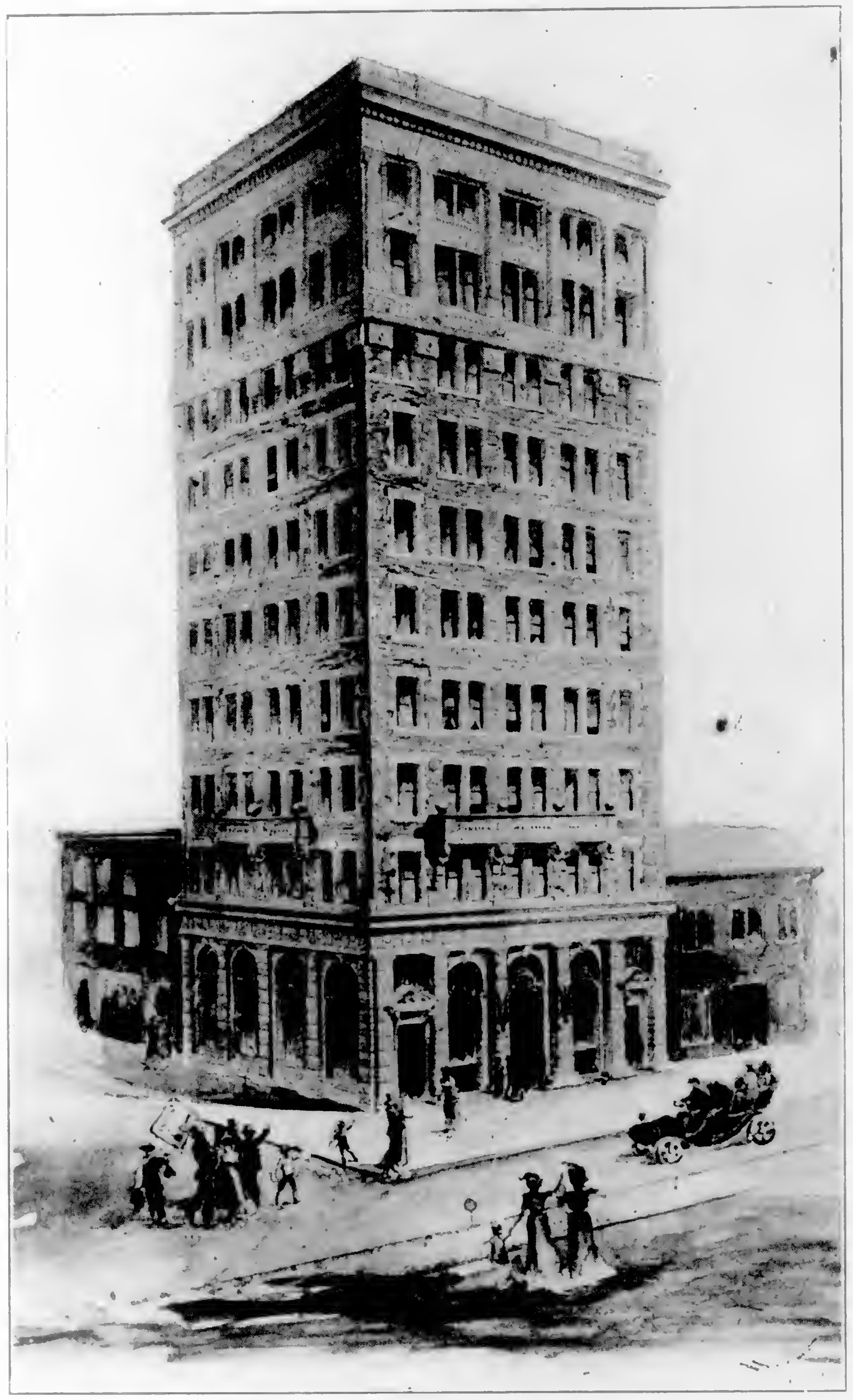
Building to be from eight to ten stories
high; Class A Construction
and to cost $120,000



Successful Design of the Bank of Italy Building, San Francisco
Frank T. Shea, Architect



Ralph Warren Hart, Architect



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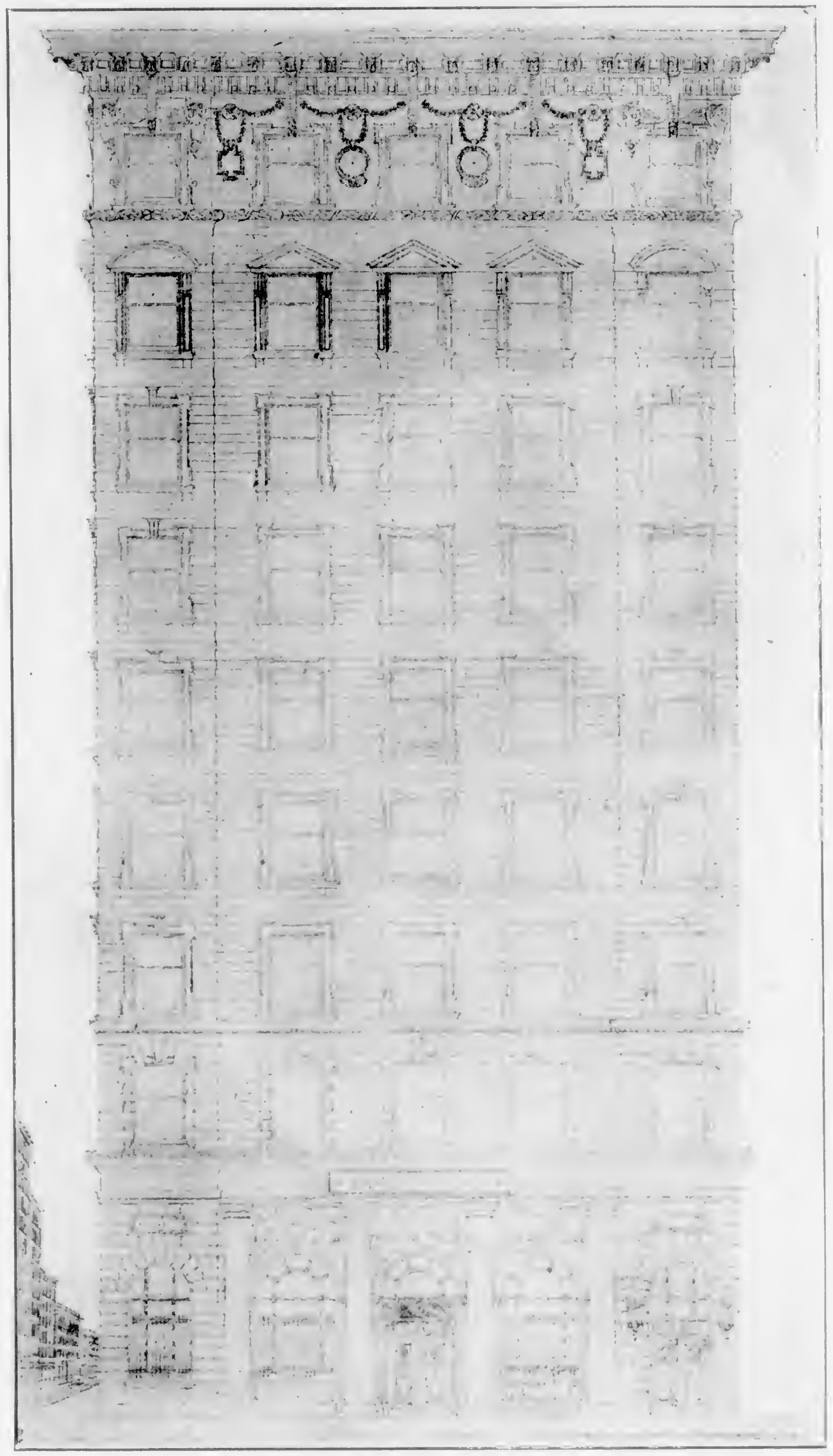

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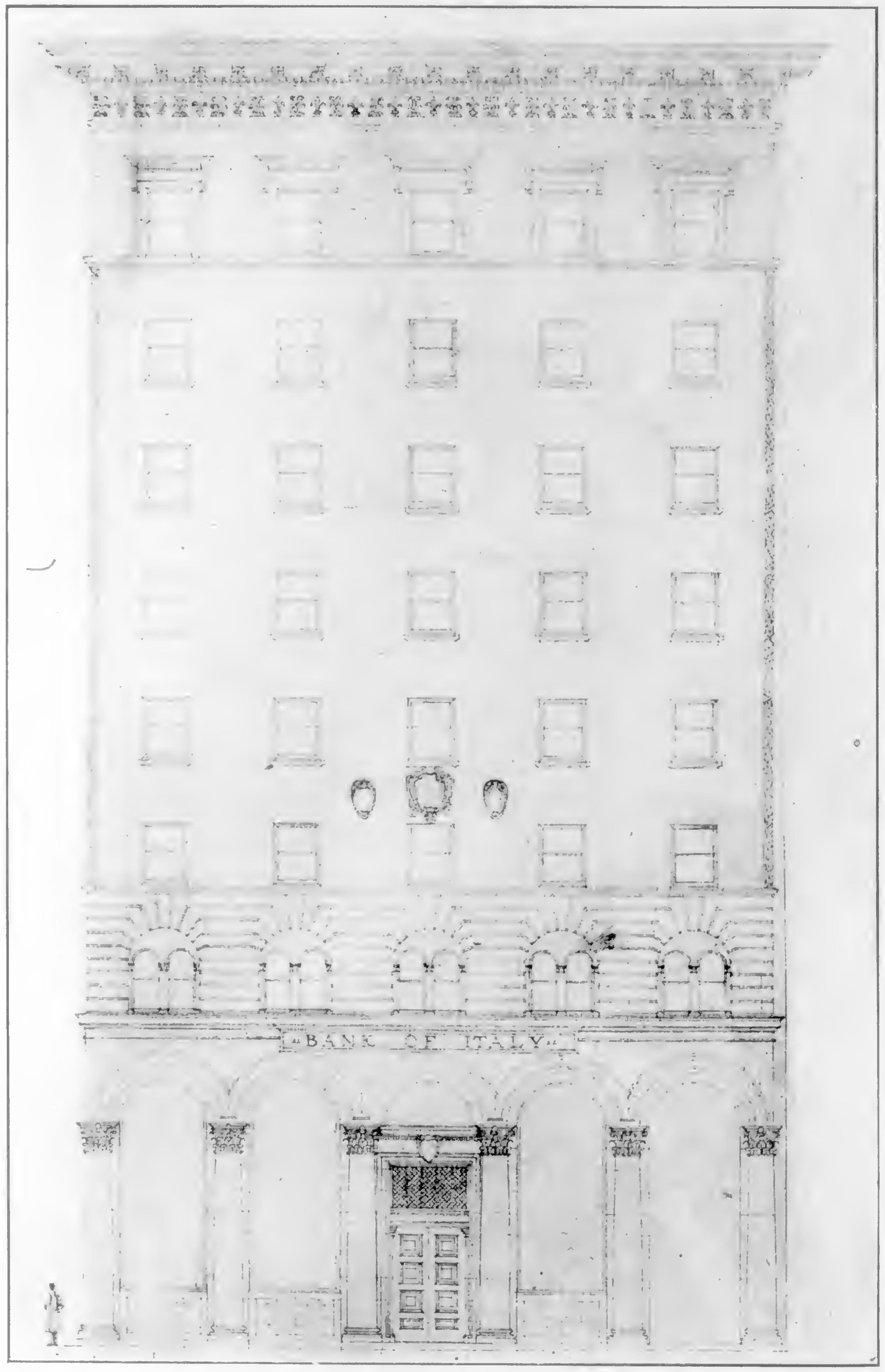
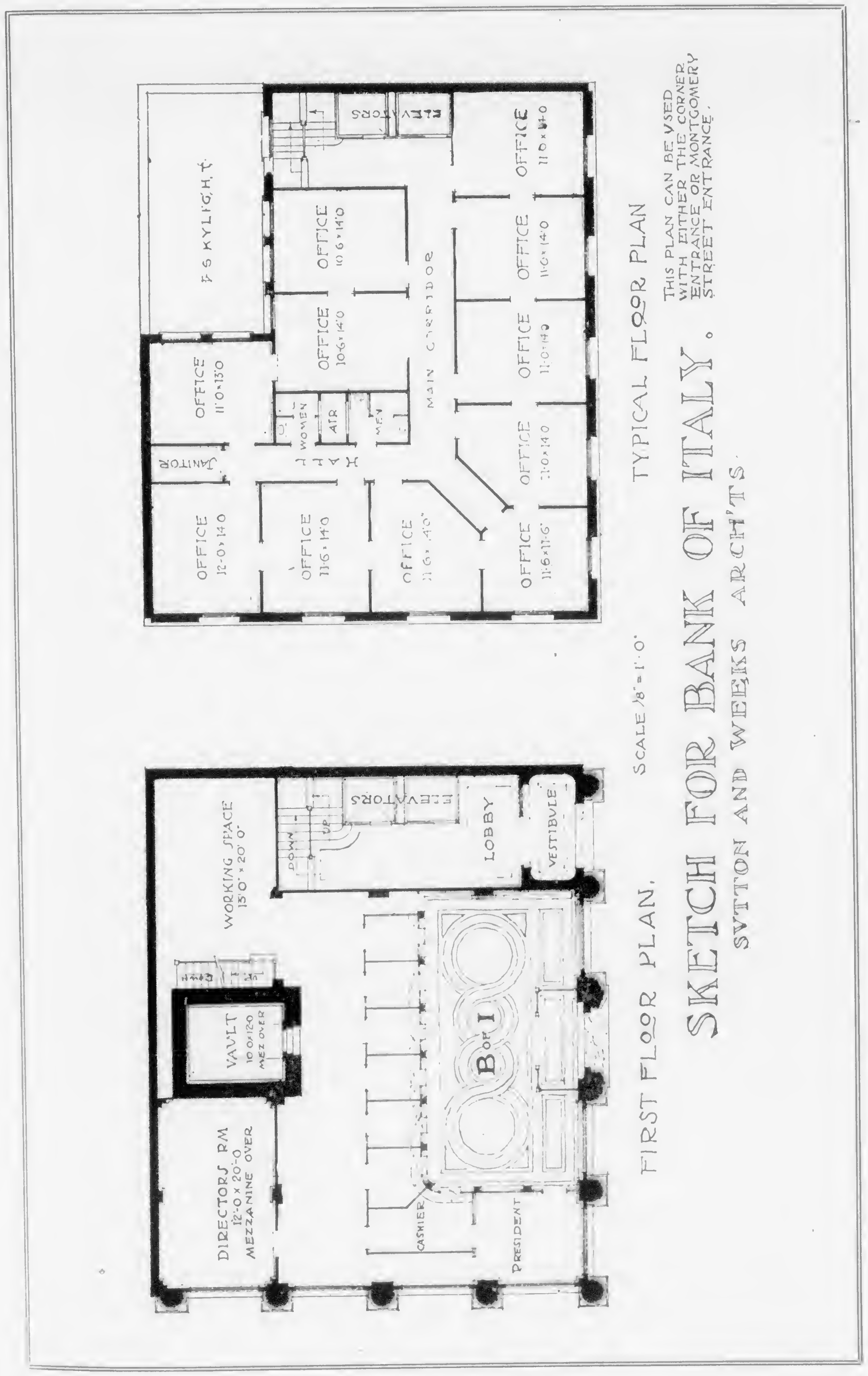
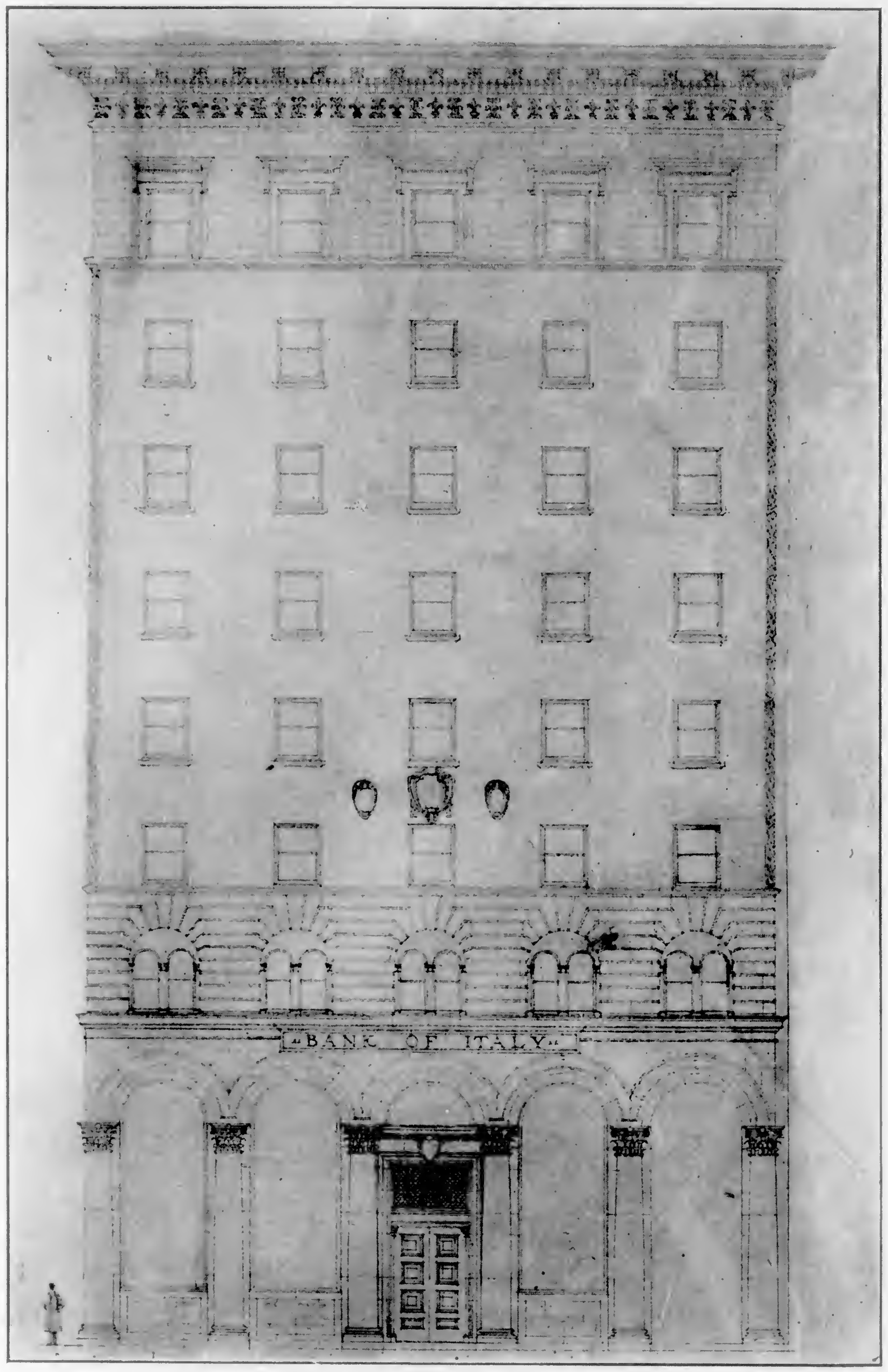


Front Elevation, Bank of Italy
Sutton & Weeks, Architects





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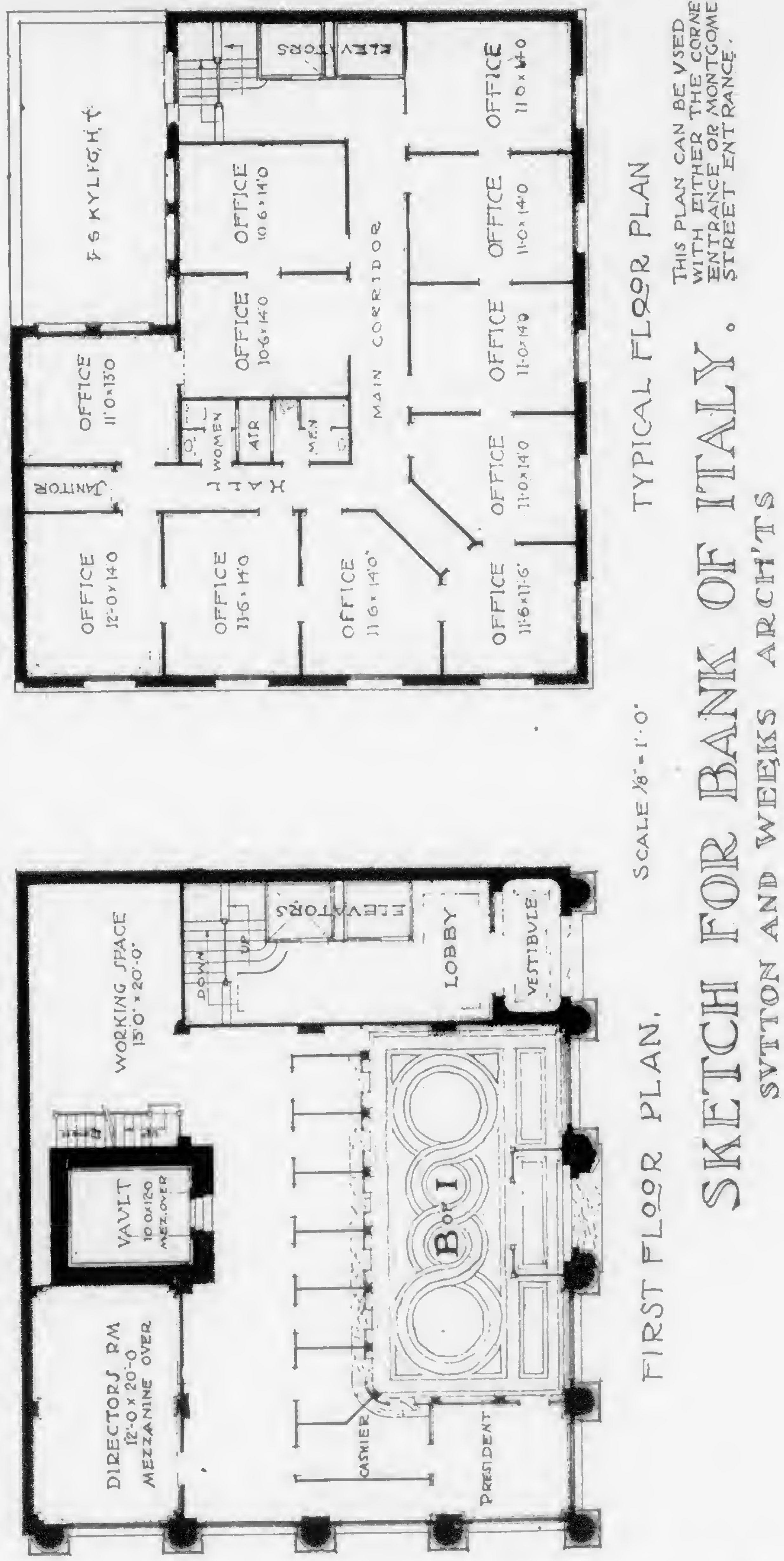
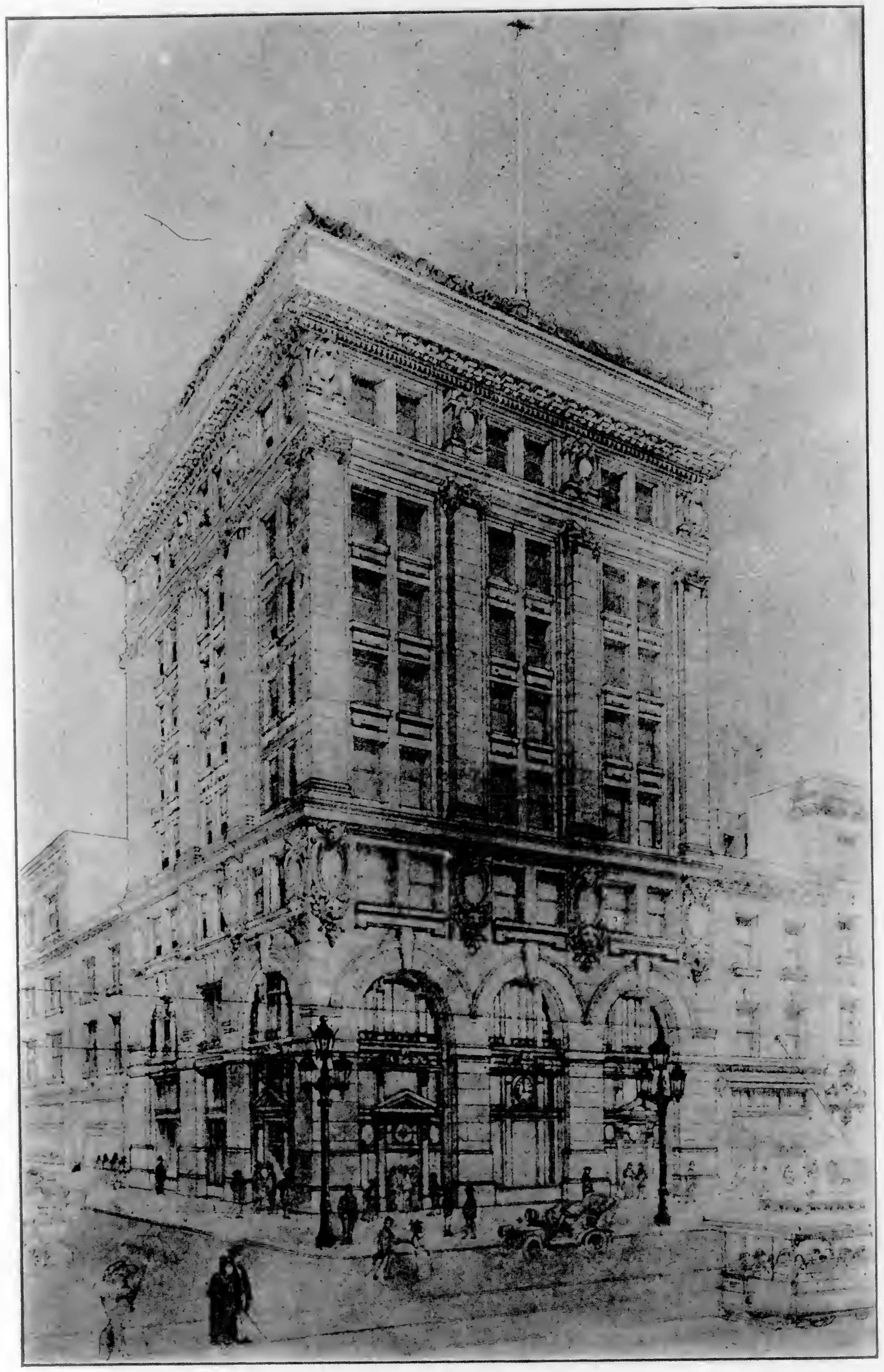
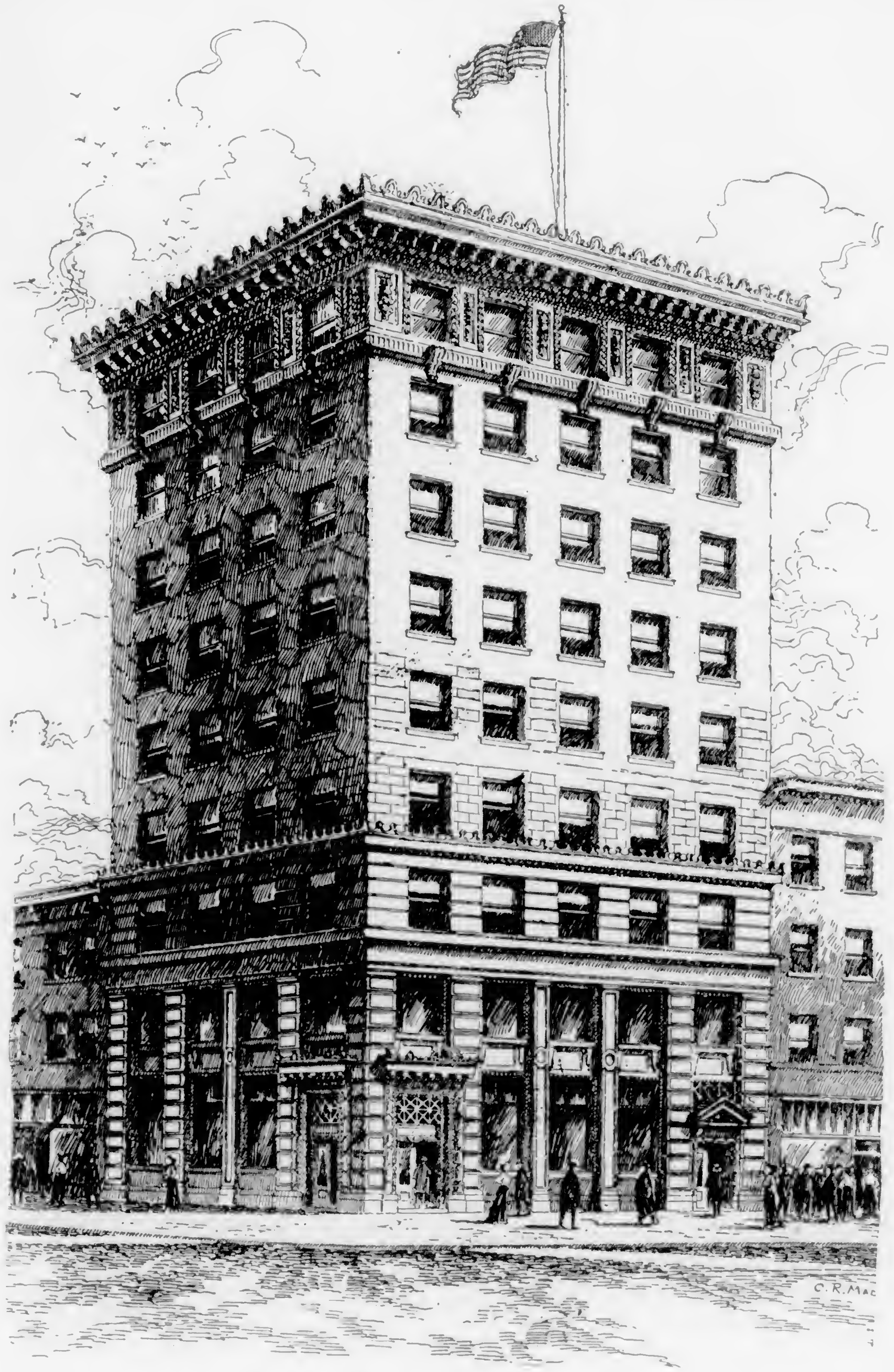
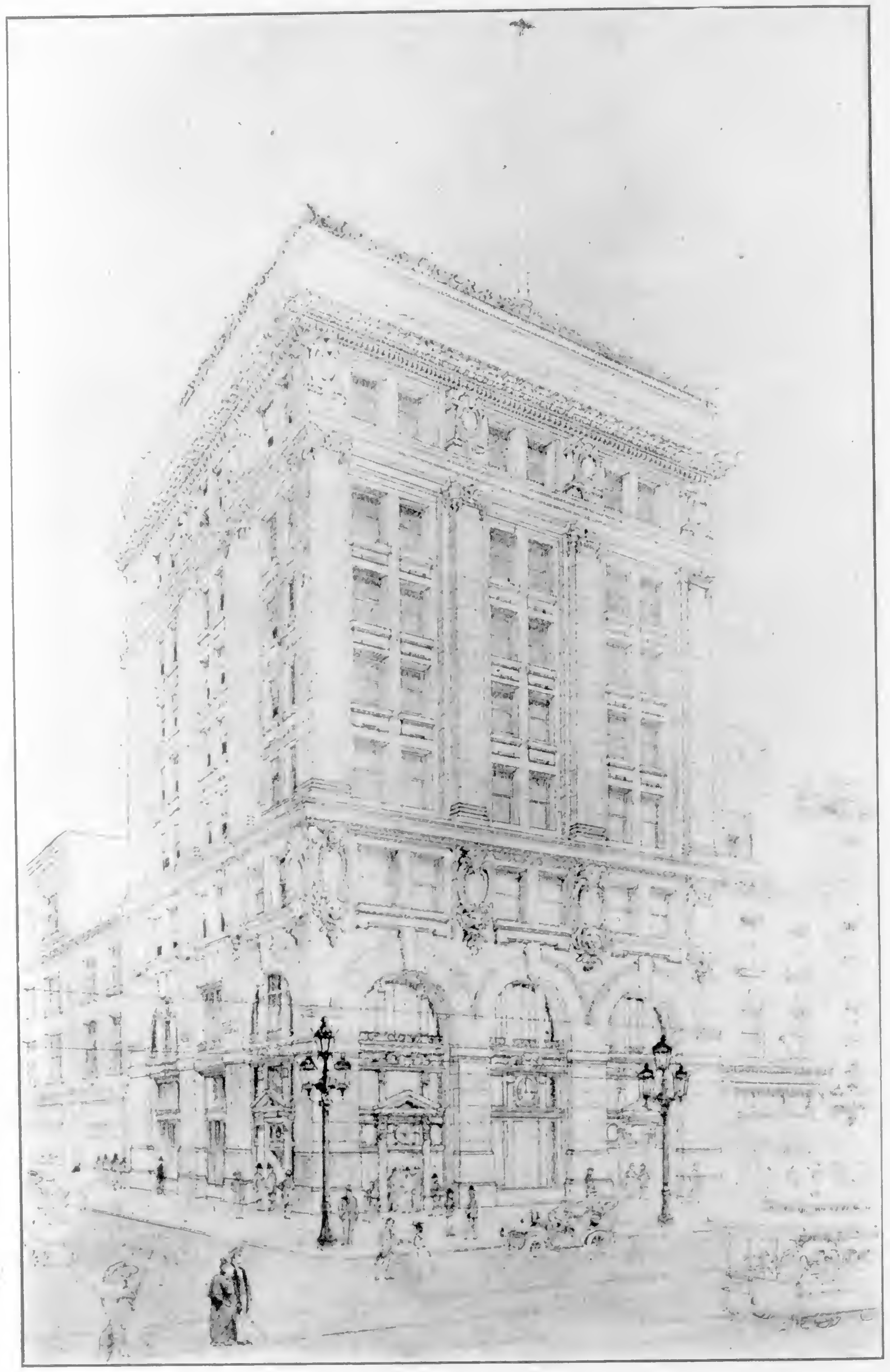




Charles Paff & Company, Architects



William Mooser & A. McMilwain, Architects



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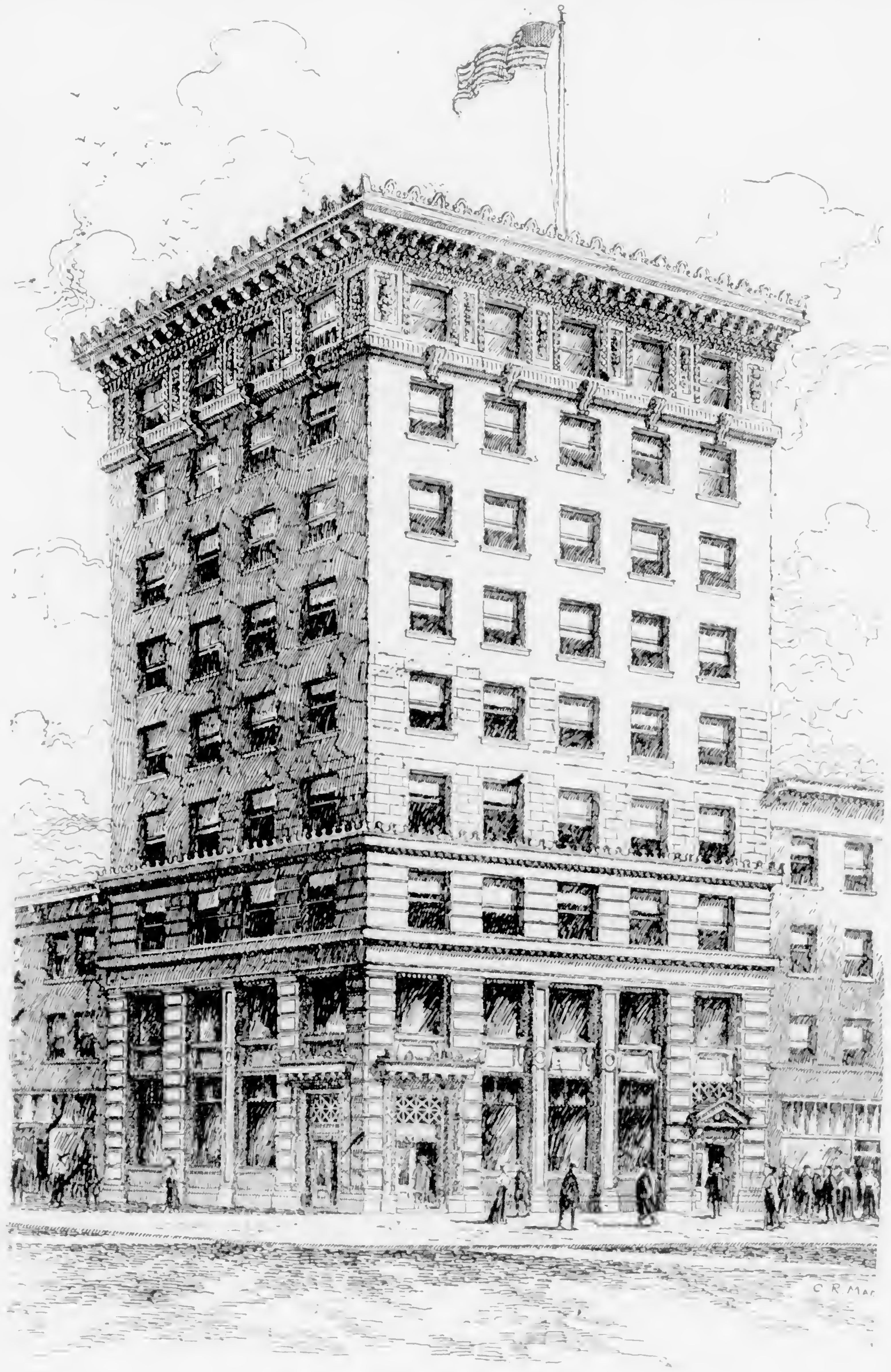
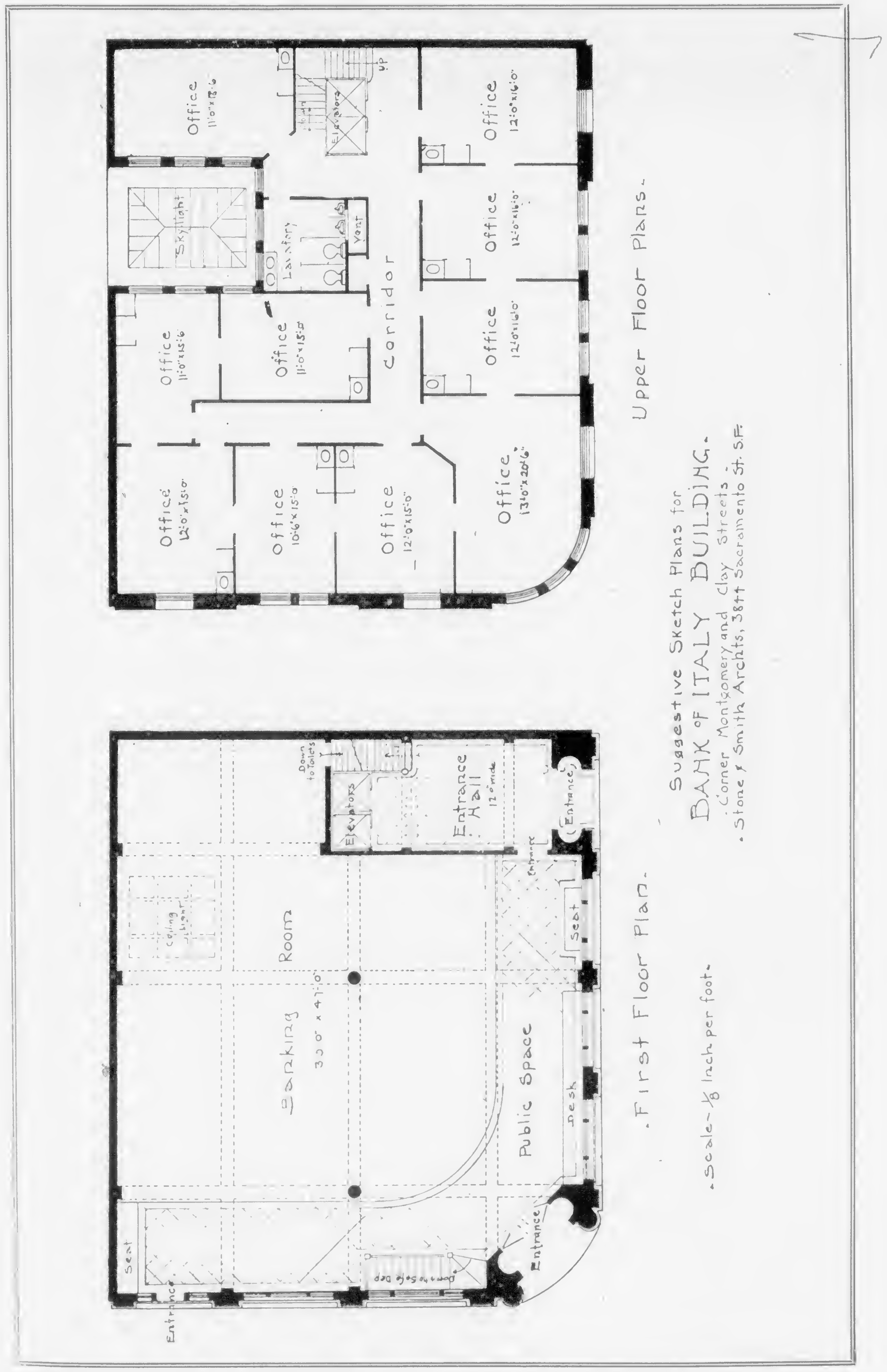
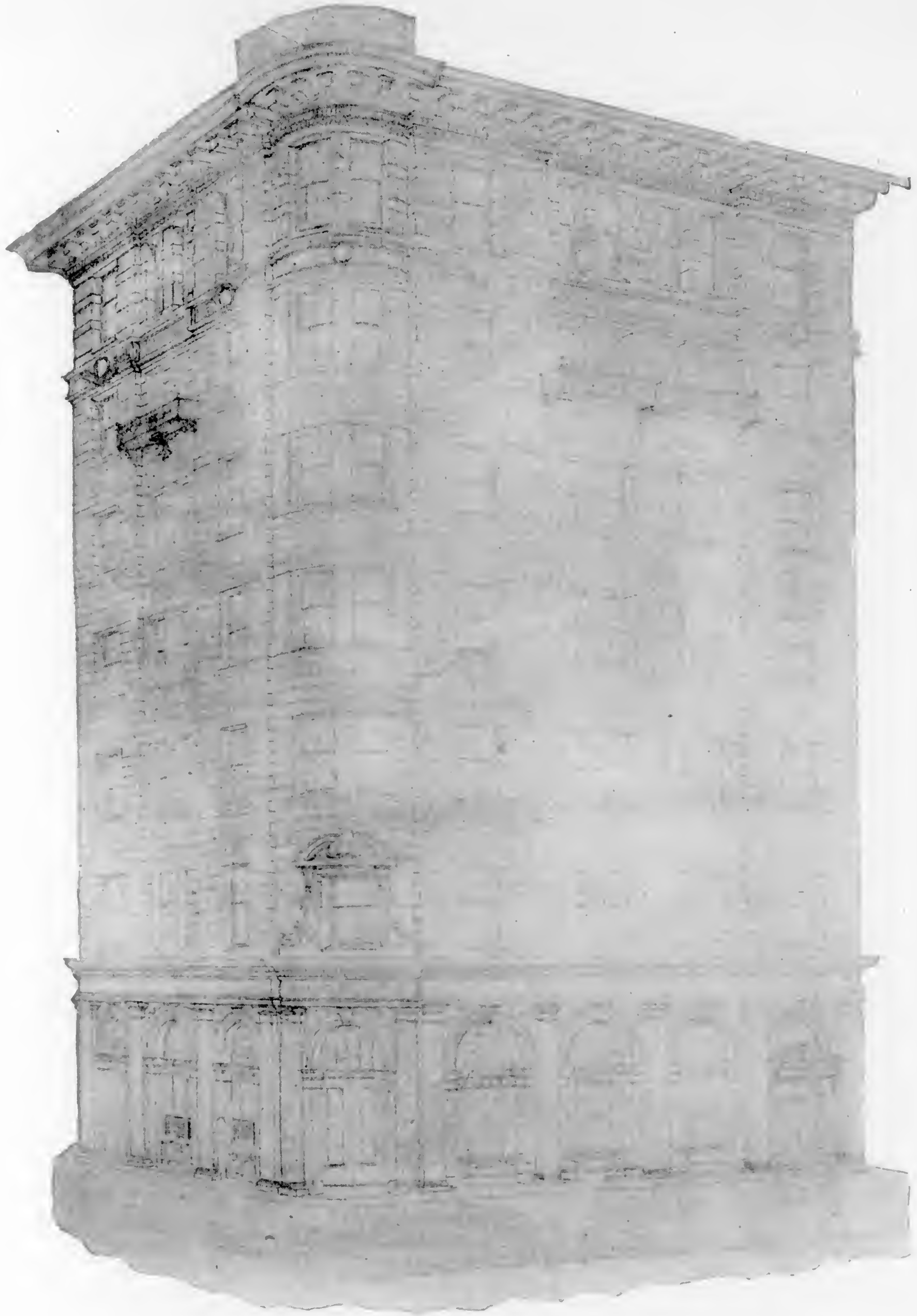


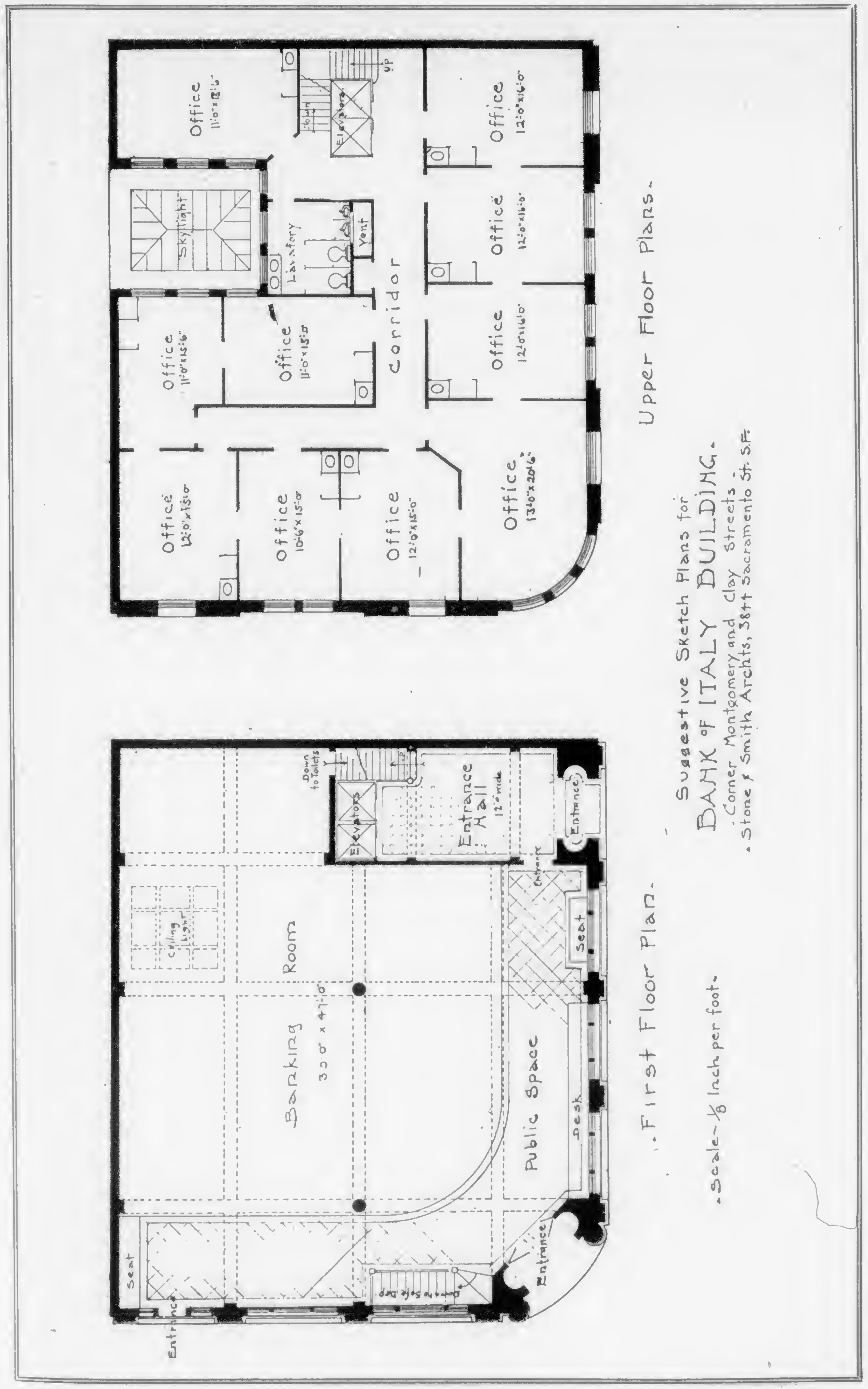
William Mooser & A. McIlwain, Architects

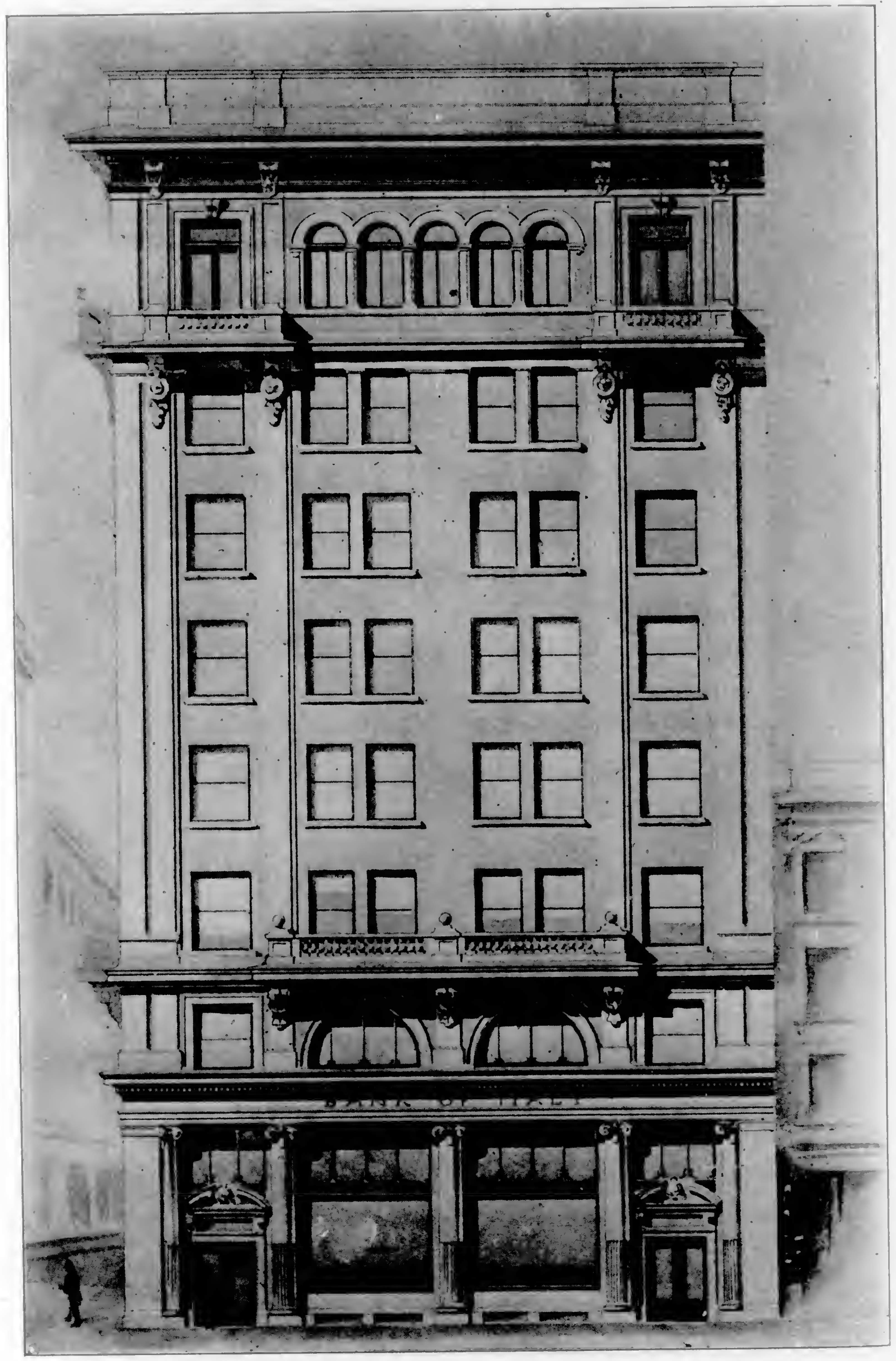
Stone & Smith, Architects



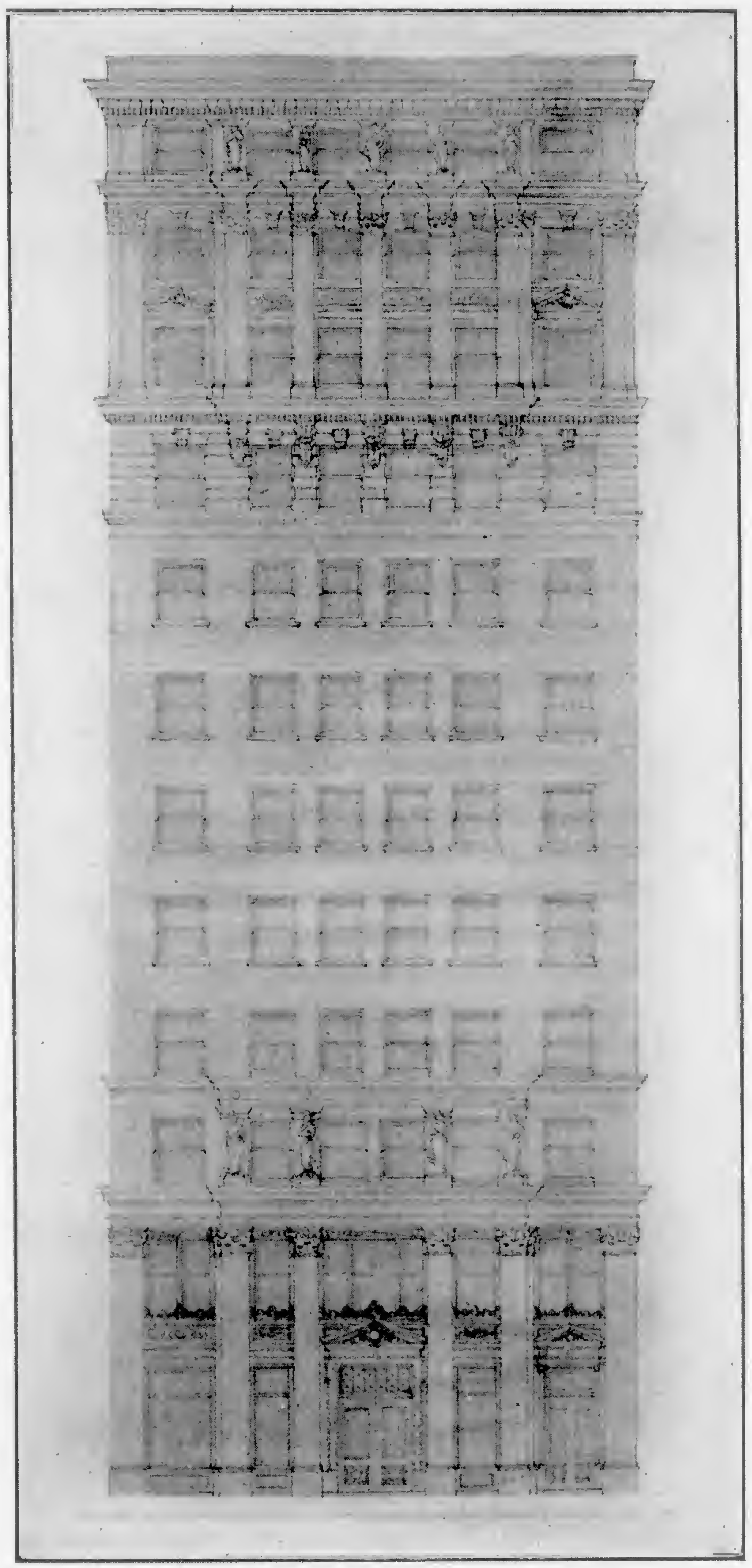


Stone & Smith, Architects

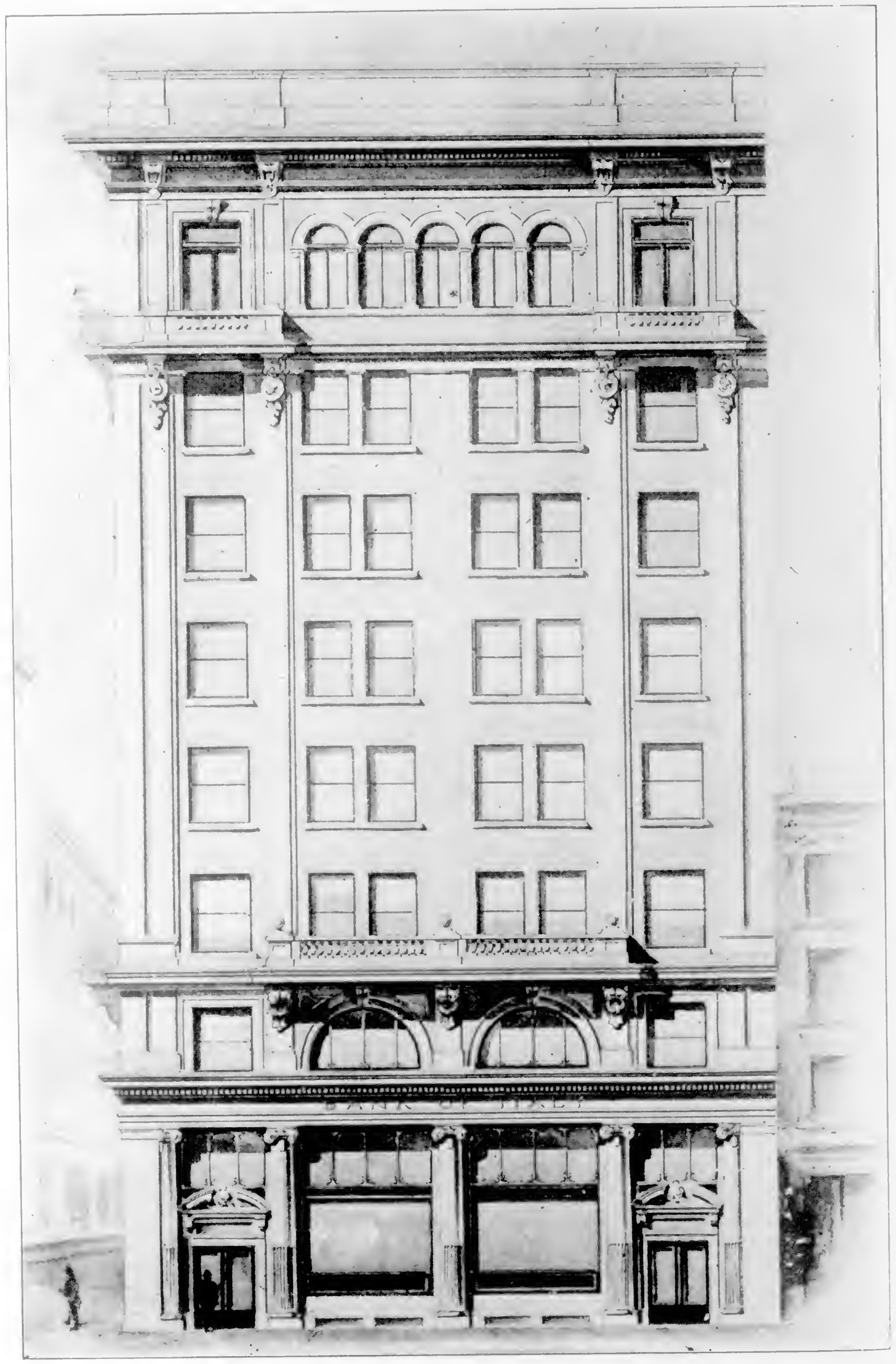




L. Mastropasqua, Designer



Loring P. Rixford, Architect



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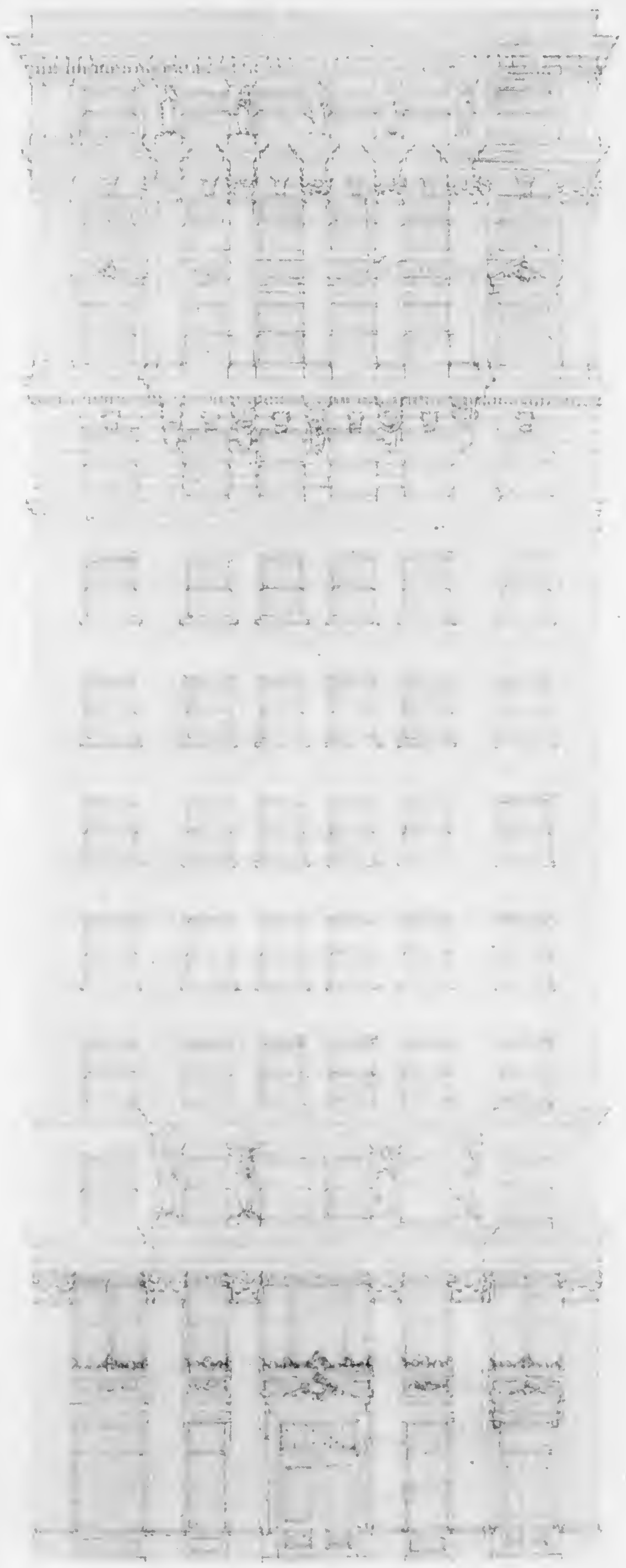


Loring P. Rixford, Architect

Government Buildings and the Tarsney Act

By WILLIAM A. NEWMAN, Architect

THE construction of Government buildings has always been a matter of public interest and at the present time in the various magazines appear several complimentary articles, giving much credit for the good work and construction which has been shown in our Federal buildings.

Certain of the larger public buildings in this country, such as the Post Offices at Cleveland, Ohio, and Indianapolis, Indiana, and the Custom House buildings at New York City, Baltimore and San Francisco, have been designed by successful architects in competitions authorized by what is known as the Tarsney Act.

As a general rule the smaller buildings are usually assigned to the office of the Supervising Architect. The largest building which Mr. Taylor has designed and completed at this date, is the magnificent new Post Office and Court House building in San Francisco.

If a building is to be constructed by the Supervising Architect of the Treasury Department, all the drawings and specifications are gotten out and the contracts awarded at his office in Washington, where a large force of expert assistants is constantly employed. As soon as operations begin a Government Superintendent of Construction is stationed at the building to direct the progress of the work, until its completion and acceptance.

If, however, the building is to be erected under the provisions of the Tarsney Act, the following is a synopsis of the modus operandi:

The United States Statutes at Large, Vol. 27, Chapter 146, authorize the Secretary of the Treasury, for such buildings as he may select, to obtain plans and specifications for the erection of public buildings for the United States authorized by Congress, by competition among architects; provided that the general supervision of the work shall continue in the office of the Supervising Architect of the Treasury Department, who is the representative of the Government in all matters connected with the erection and completion of such buildings.

At least five architects of good professional standing, who are citizens of the United States, shall be invited to submit plans, drawings and specifications, to be passed upon as to merit by a commission appointed by the Secretary of the Treasury, consisting of the Supervising Architect of the Treasury Department, and two architects, or experts in the construction of buildings.

Full data and information as to cost and general requirements of the buildings will be furnished competitors.

The successful architect will receive in compensation for his full professional services, including local supervision of the building, a fee computed at the rate of 5 per cent upon all sums up to $500,000; 3½ per cent upon the next $500,000, or any part thereof, and 2½ per cent upon any excess beyond $1,000,000.

The Department agrees to make selection from the designs submitted, if, in its opinion, one suitable in all respects as to design, detail and cost be submitted; but reserves the right to reject any or all, and reopen the competition if no suitable design has been received.

A detailed estimate of cost must also be furnished by the competing architects.

A competitor will forfeit all privileges, who shall violate any of the conditions or who seeks in any way directly or indirectly to gain advantage by influencing in his favor any of the commission.

No member of the commission or employee of the Treasury Department shall have any interest whatever in any design submitted.

The drawings are to be forwarded without any distinguishing mark, accompanied by a sealed envelope containing the name and address of the competitor, which will be numbered, and opened when the final selection has been made.

The commission is to examine the drawings, etc., and give to each the rank to which, in their judgment, its merit entitles it, and submit their findings to the Secretary of the Treasury.

The selection of one of the designs by the Secretary of the Treasury, the Postmaster General and the Secretary of the Interior, shall be final and conclusive.

Upon the award of the contract to the successful architect all designs of unsuccessful competitors will be returned to them, and no use will be made of any drawings not accepted, or of any part that may be original without consent of the author.

Among the appropriations, of interest to this Coast, passed at the last session of Congress for the purchase of sites and erection thereon of new Federal buildings may be mentioned the following: Sub-Treasury, San Francisco, $375,000; Baker City, Oregon, $65,000; Ogden, Utah, $120,000; Santa Rosa, Cal., $70,000; Eureka, Cal., $120,000; Santa Cruz, Cal., $15,000; San Diego, Cal., $150,000.

* * *

Some Pointers on the Contracting Business

RESPONDING to an inquiry, a correspondent of the National Builder makes the following suggestions to a man about to embark in contracting. Some of the suggestions may appear biased, but they are given for what they are worth:

You may be ever so good a mechanic, understand every detail of the work from A to Z, systemize your work and give it your whole undivided attention for sixteen hours a day throughout the season, and all this will not get you there!

A knowledge of business tact, of graft and put-up-jobbery, is as essential to the successful contractor as is a knowledge of the use of the steel-square to the roof-framer. For in the contracting business a job is not awarded to the party making the fairest bid, but to the party making the lowest bid, and any time a half-dozen bids are tendered for any job, it is a safe assumption that two of those bids are below any reasonable profit to the contractor. In the face of this competition it is up to your would-be-contractor to somehow swing a job unto himself at a remunerative figure. I have read all sorts of works on how to do things about a building, but until the student has learned this other thing, he is as unfit for the open field as is a wooden pup unfit for a field trial.

The power that an architect holds to make or unmake a contractor is to be respected, not because of its moral exercise, but because of its potency. The extent to which the general building public can be operated upon is one of the amazing wonders that will appear to your correspondent as he ripens in the service.

However, here are a few general rules that I would lay down to the young contractor.

Keep an accurate and full account of every item that enters into the cost of every job. After a time these accounts will be a handy reference and means of comparison between the jobs done and the jobs being figured upon. This should prevent any serious variation from the actual cost of constructing the building under consideration.

Do not take any one's word for what any building has cost! Here is where many a young contractor is caught. Few contractors will acknowledge having lost anything on a job. To do so would be to admit their own inability to estimate and handle work properly. The architect is usually there also with an under-estimate unless some favored contractor is concerned. The reason is this: The prospective builder employs an architect to draw up a plan for a $3000 cottage. If he draws such a plan the prospective builder will not be satisfied. He has heard of a cottage here and there, that was built for $2870 and a much better cottage. He knows that $3000 should get him a much better building. The architect anticipates this or he would have done his work for nothing, so he draws up a $3500 plan. The owner is satisfied and it is up to the architect to get this job done for $3000 or lose his work. These are the snares that get the uninitiated and incompetent contractors.

Do not lose any time in trying to get a job that does not appear to be coming your way. Do not bid upon it if you believe that any other contractor is preferred. If your bid is wanted very much, you will find it out in time. Unless you feel that you are the favored contractor, tender a sealed bid at the hour of opening and see to it that all envelopes to be opened are in sight before any of them are opened.

Do not be in a hurry to get in your figures. It is here where the eleventh-hour man is not so easily handed the worst of it. In nearly all put-up jobs the last man to bring in figures is the protected party.

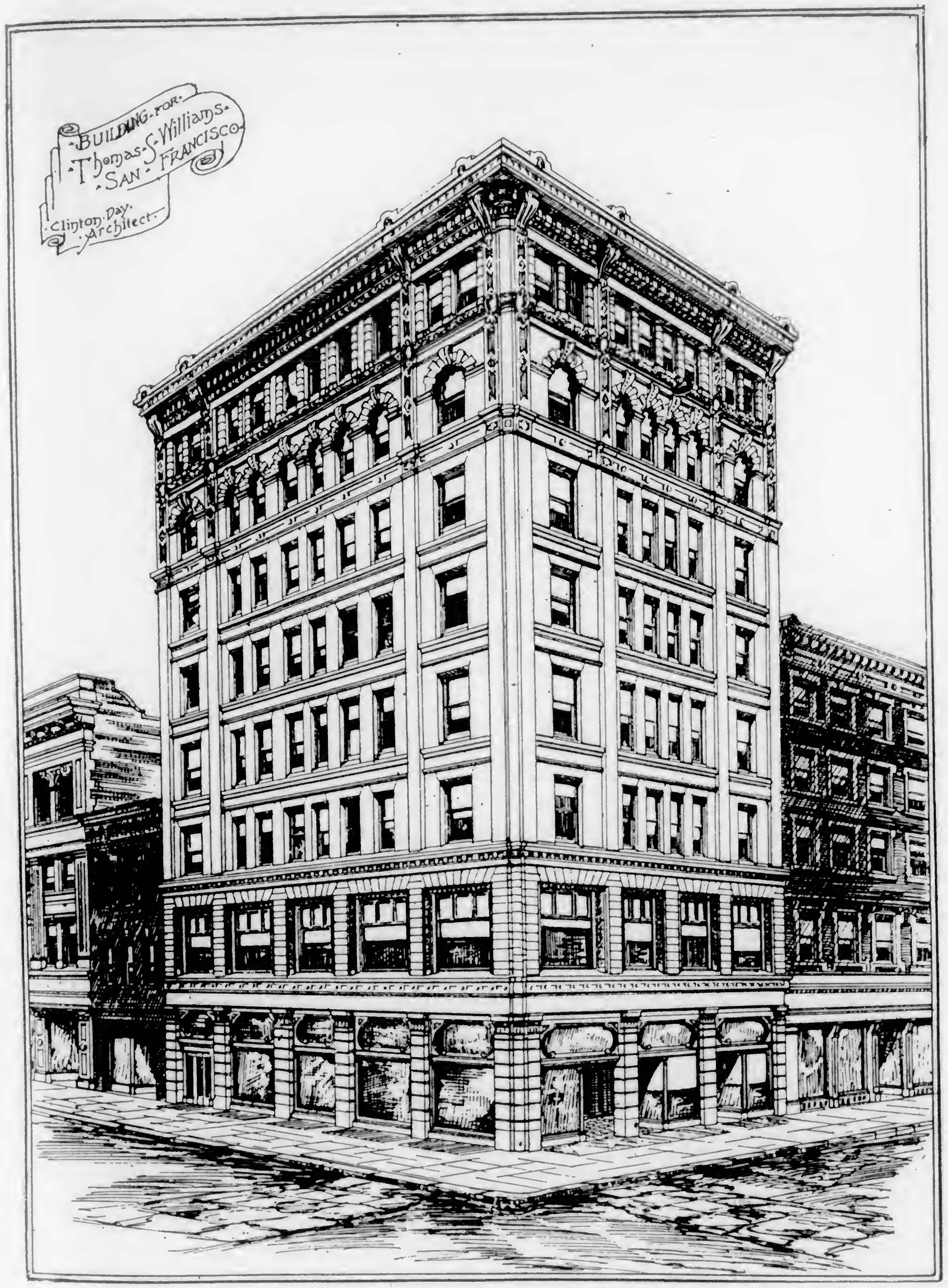
When all is said and done there is little use in trying to get any job that is fixed up for another. A sucker is born and not made and you will lose lots of valuable time in trying to lure a sucker from his fate with trout flies. You will do much better to cut out a sucker from the vast multitude for your own exploitation. A trout belongs to whoever gets him, but a sucker belongs to whoever sees him first.

Then there is much to be learned in diplomacy in turning off work. Here again is where the architect gets in his deadly work. Read your specifications very carefully and study your plans thoroughly. You may be able to erase and rewrite the copy that is used as "exhibit" in your contract and protect yourself from a lot of imposition. Unless you are the favored contractor, the imposition will be there laying for you.

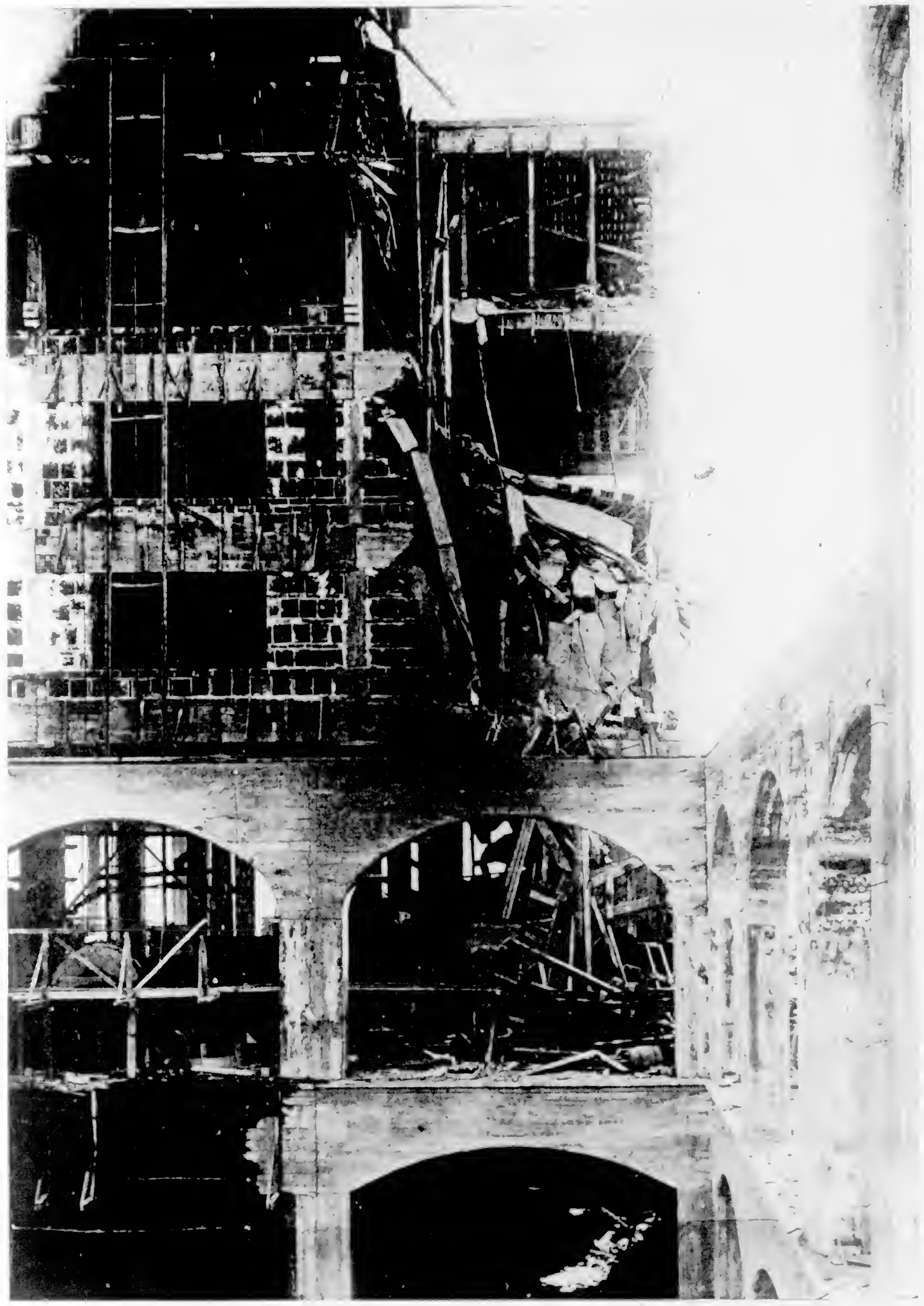
Do not stand for unnecessary complaints and criticisms from the owner. If you want his respect and fair treatment, call him down in a sincere and business-like manner. Do not argue or discuss the job with him. You know when the work and material are right, let that settle it. If you submit to any ill-humored complaints, there will be no limit to what will be coming to you and the impression will go out that it is all due you.

If there is anything about your work that you do not understand, be careful that no one finds it out. Your own men will advertise it and your enemies will use it against you.

As a rule, do not employ men who are forever talking about how to do work. It is these who usually know the least about it. And any sincere student will study his work at a leisure hour in a silent manner. Cut out those who are forever talking about tools and work.



The Williams Building now under construction in San Francisco
Clinton Day, Architect



View of center wing of Bixby Hotel, showing where supports were removed under the north panel of the fifth story floor. The concrete on the roof is twenty four hours old; the floor slab of the fifth story is twenty days old.

Partial Collapse of the Bixby Hotel at Long Beach

ON the morning of November 9th last the Bixby Hotel at Long Beach, Cal., one of the largest reinforced concrete buildings in the world, partly collapsed. In this accident ten lives were lost and about a dozen workmen were injured. The collapse of the hotel, aside from its tragic features, has proven an event of no little significance in the building world. At first there were grave fears that the disaster might result in a setback for reinforced concrete construction, but careful investigation by those in a position to judge has resulted in a complete vindication of this type of construction. The accident, appalling as it was, has served to call attention to the absolute necessity of employing good men and using good material in reinforced concrete work. In this case there appears to have been nothing wrong with the material—the real cause, apparently, being the absence of proper engineering supervision. The accident will probably result in the employment hereafter of only competent persons to design and build structures of this particular type. And it is bound to prove of great benefit to San Francisco builders in warning them of the dangers in taking liberties with the method and in demonstrating the necessity of the utmost precaution both in architecture and engineering.

The architects for the Bixby Hotel are Messrs. Austin and Brown, of Los Angeles, and the contractor, F. L. Spaulding of Long Beach.

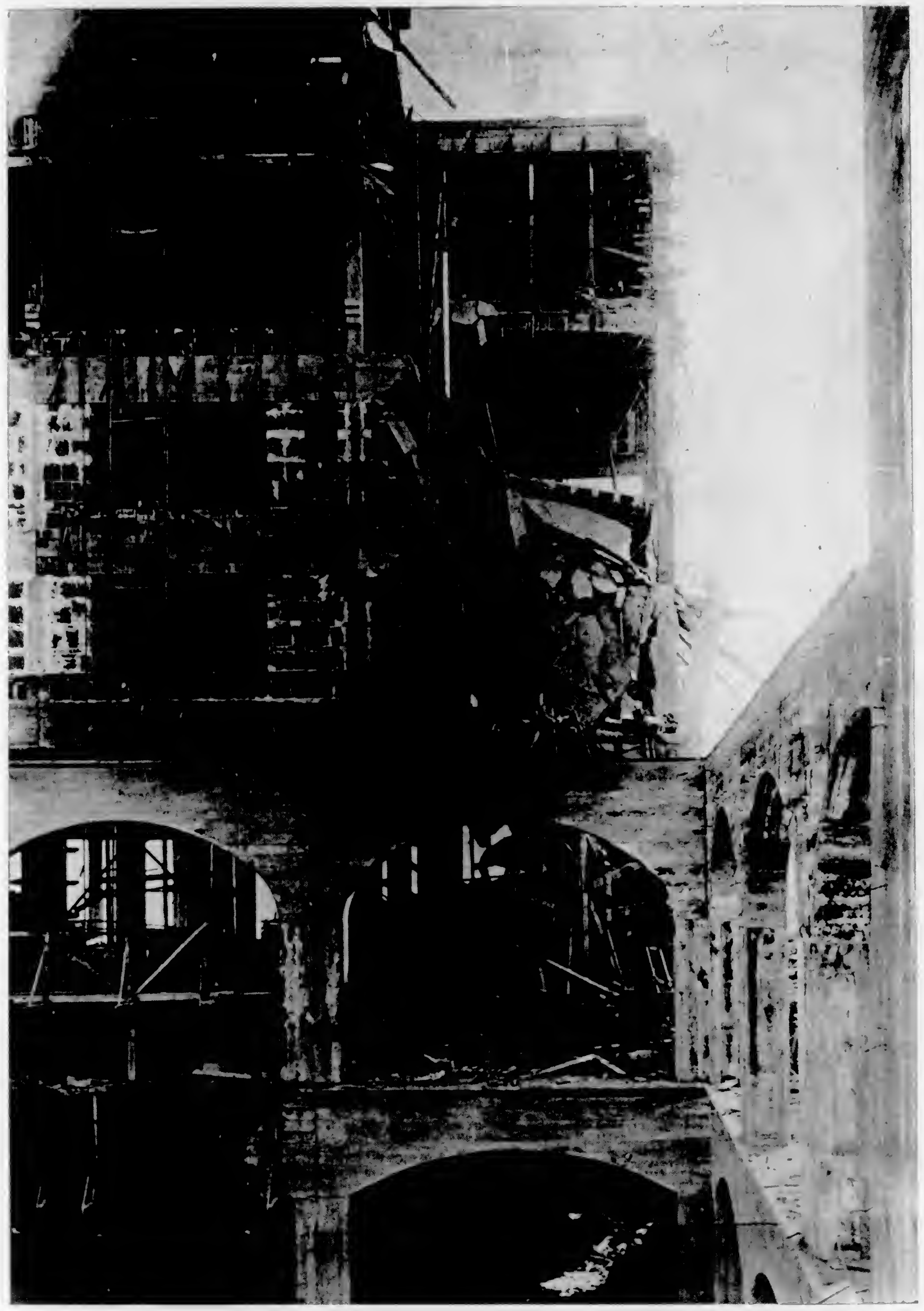
It is gratifying to note that following the examinations by experts of the collapsed hotel, reinforced concrete, as a structural material, has in no way been shown to be a failure. The investigations proved that the floors in the upper stories of the hotel were not of the purely reinforced type, but were a composite in which 60 per cent of burnt tile was used. The lower floor, which was entirely of reinforced concrete, withstood the shock of the tons of debris that fell.

The inquiry further demonstrated that the supports or forms were removed before the cement was thoroughly aged, and had the cement been properly handled in the course of construction there would have been no collapse. The owners of the hotel have shown their confidence in the type of construction by ordering the architects to proceed at once to rebuild that portion of the structure which was damaged.

The estimated cost of the Bixby Hotel was $350,000. The loss as a result of the accident will probably not exceed $50,000. The plans called for a five-story building, the latter being shaped like the letter "H." It was the bar to the "H" which gave way and carried down the five stories. The Kahn system of reinforcing was used in the construction of the building.

Heber & Thayer, representing the Trussed Concrete Steel Company in Southern California, claim to have had no part in the designing of the building further than the beams and floors. T concrete beams were used for the floors, the space between the joists being filled with a row of hard burned terra cotta tile with scored sides, to insure a firm connection with the concrete. The tile has no bearing power, its chief advantage being to lessen the dead weight. The Kahn representatives assert that their system was not being used on the roof, at least not in conformity with their designs. They declare an additional story was added by the architects after the original plans were made, and that a young and inexperienced engineer was employed. It was this last story that gave way while the workmen were busy pouring the cement into the roof forms.

A coroner's jury rendered a verdict three days after the accident. The jury found that the collapse was occasioned by the premature removal of part of the timbers supporting the fifth floor.



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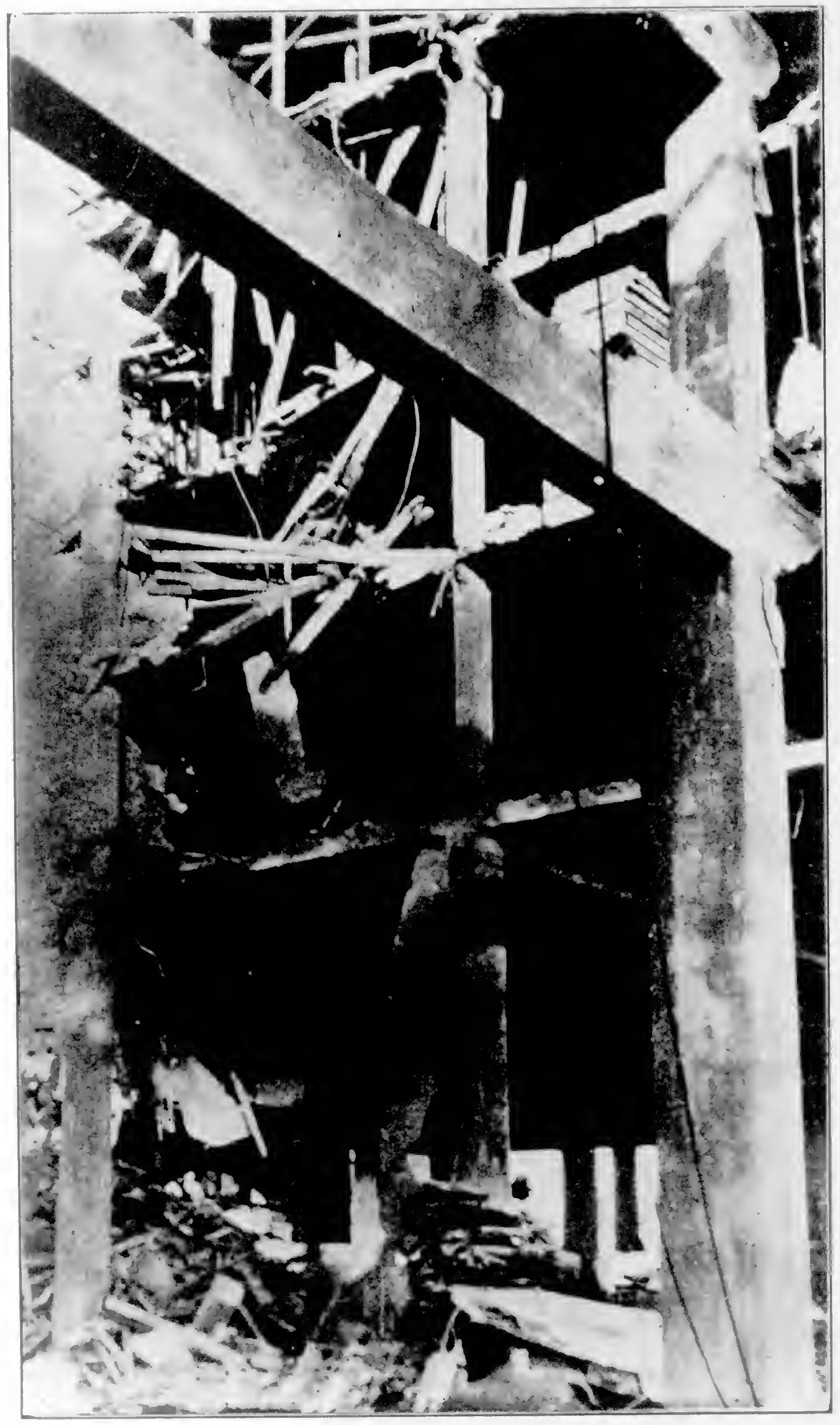
A coroner's jury rendered a verdict three days after the accident. The jury found that the collapse was occasioned by the premature removal of part of the timbers supporting the fifth floor.

SAYS COLLAPSE STARTED FROM THE TOP

By JOHN C. AUSTIN, of Austin & Brown, Architects



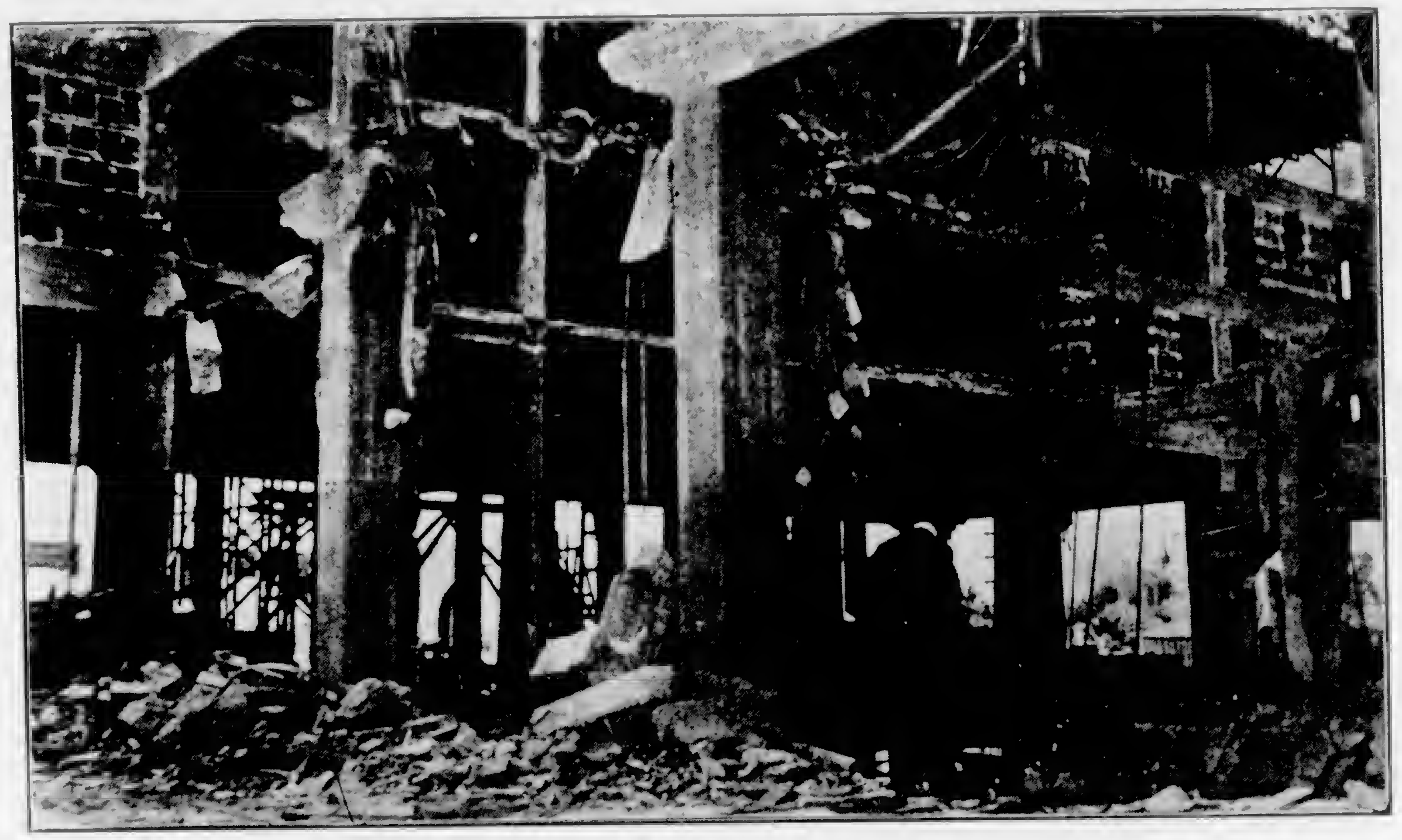
Showing One of the Reinforced Concrete Spandrel Girders. Bixby Hotel, Long Beach

AFTER making a careful examination of the Bixby Hotel at Long Beach, for which we are the architects, we have been unable to find any other cause for the failure of a portion of the center wing other than the following:

The fifth story floor had been in place eighteen days, and the supports and forms for the roof were installed over the floor of the fifth story, and all of the concrete for the roof was being poured when the collapse occurred. One or two days before the collapse the forms under the fifth story floor in two panels, each panel being the full length of the wing, had been removed, leaving this floor only eighteen days old to support its own weight, the weight of all the forms, and the dead weight of the roof.

Our theory is that the fifth floor and the roof started simultaneously, and that the impact, plus the weight, was too much for the fourth story floor to carry. It is well demonstrated on this building that the method of construction was perfectly capable of sustaining the loads for which it was designed when the concrete was of sufficient age.

As will be seen by the photographs, several of the floors are now carrying in the form of debris, many times the weight they are supposed to be capable of sustaining. All of the evidence goes to show that the collapse started from the top, and that before the falling material had time to reach the first and second stories it was possible for men to escape to the side wings from a position of at least twenty feet under the fallen part.



View Showing Condition of the Basement after the collapse.

We are now uncovering the piers to demonstrate that no change has taken place in their position, and our instructions from the hotel company are to proceed with the building to its final completion without any deviation from the original plan, and with as little delay as possible.

* * *

BLAMES HOLLOW TILE WALLS

By OTTO H. NEHER, Architect

AFTER having gone through the ruins of the Bixby Hotel, I am more than ever before convinced that there is no better method of construction than reinforced concrete. I am absolutely opposed to the use of hollow tile in flooring as well as in curtain walls, and I am convinced that this accident could not have happened if the ceilings and curtain walls had been constructed of reinforced concrete.

Curtain walls and ceilings of reinforced concrete are particularly desirable for withstanding earthquake shocks, for a steel structure as well as for a reinforced concrete skeleton; brick or hollow tile and mortar will not stand a severe shock, no matter how good the construction.

* * *

CALLS IT MONGREL CONSTRUCTION

By LOUIS A. HICKS, C. E.

I MADE a special trip to Los Angeles, and in company with Carl Leonardt made a minute examination of the collapsed building. I discovered first of all a lamentable lack of continuity in the line of cleavage at the jointure in the beams and columns. I found several instances where the columns had shifted at the beam joints with no evidence of severe weight of falling debris to cause it. A fallen pillar showed us how the concrete had been poured separately and no continuous bars were run up through the

SAYS COLLAPSE STARTED FROM THE TOP

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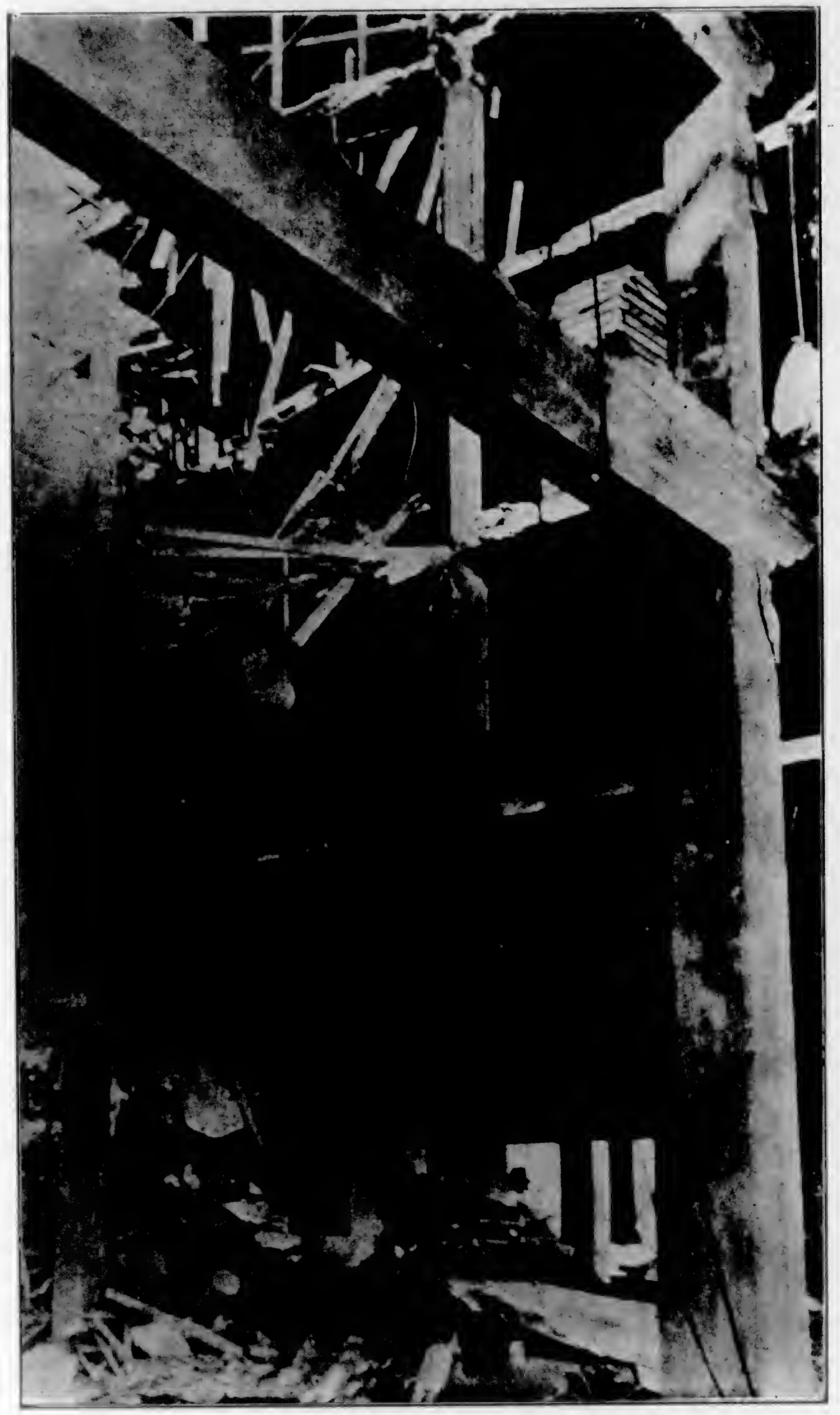

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* * *

VICTORY FOR PURE TYPE OF REINFORCED CONCRETE

By CHARLES F. WHITTLESEY, Architect

THE collapse of the Hotel Bixby, instead of being an injury to the cause of reinforced concrete construction of the pure type, such as is used in San Francisco and Los Angeles, should be a great victory for it. The hotel is not what you would call an example of the pure type of reinforced concrete construction. It is more of a composite construction of a new type in which about 60 per cent of burnt clay tile is used with 40 per cent of reinforced concrete in all of the upper floors. In the single instance where reinforced concrete was used entirely the results were most satisfactory. I have reference to the lower floor, which stood the tremendous weight of the great mass of debris which crashed down upon it from the four stories above.

The failure clearly started at the top, where the concrete was being deposited in the roof forms. The spans were long and the mass of wet concrete was very heavy and the temporary supports for the form boxes and false work were weak and insufficient. These gave way and precipitated the whole mass with terrific impact upon the next floor below, the fifth story, which was yet green and from which the forms had been recklessly removed too soon, for use in other parts of the building. Not having had age enough to stand so great a shock it went down with its load to the next floor, which was likewise unable to stand the constantly increasing load, moving with increased momentum. Thus each floor below was attacked in turn, all of them falling until the lower floor, before mentioned, was reached. This being of the all reinforced concrete type proved to be capable of sustaining the shock and did not fall except in the center span where the mountain of debris fell with such awful and irresistible attack that it went through to the basement, which stood 20 feet high when I saw it.

This should be an object lesson to those having a little knowledge of the theory of reinforced concrete construction, yet lack the experience for its practical application. In this case I think that the blame cannot be placed with the architects of the building, for they frankly acknowledge their inexperience in reinforced concrete work and intrusted the structural design to engineers who professed a knowledge of the subject, but who had had little or no actual experience.

While the floors would have been able to sustain any ordinary load, they were weak in design. There was no adequate provision made for shear at the beam ends and the reinforcing metal was not placed in accordance with the best engineering practice. There were no bracket connections at the intersection of beams and columns and because of the introduction of so much tile in the construction the whole system was very weak in resistance to shear. The superintendent of the work for the contractor was a man known to have a reckless, dare-devil spirit, and through his lack of discretion and caution more than any other cause is due the catastrophe.

As an instance of the possibilities of reinforced concrete construction let me mention that in the new Los Angeles Auditorium, which is an all reinforced concrete building of great size and for which I had the honor of preparing the plans, there are three concrete girders of 42-foot span carrying a concentrated center load on each of 100 tons. There are also concrete roof trusses in this building having a clear span of 112 feet.

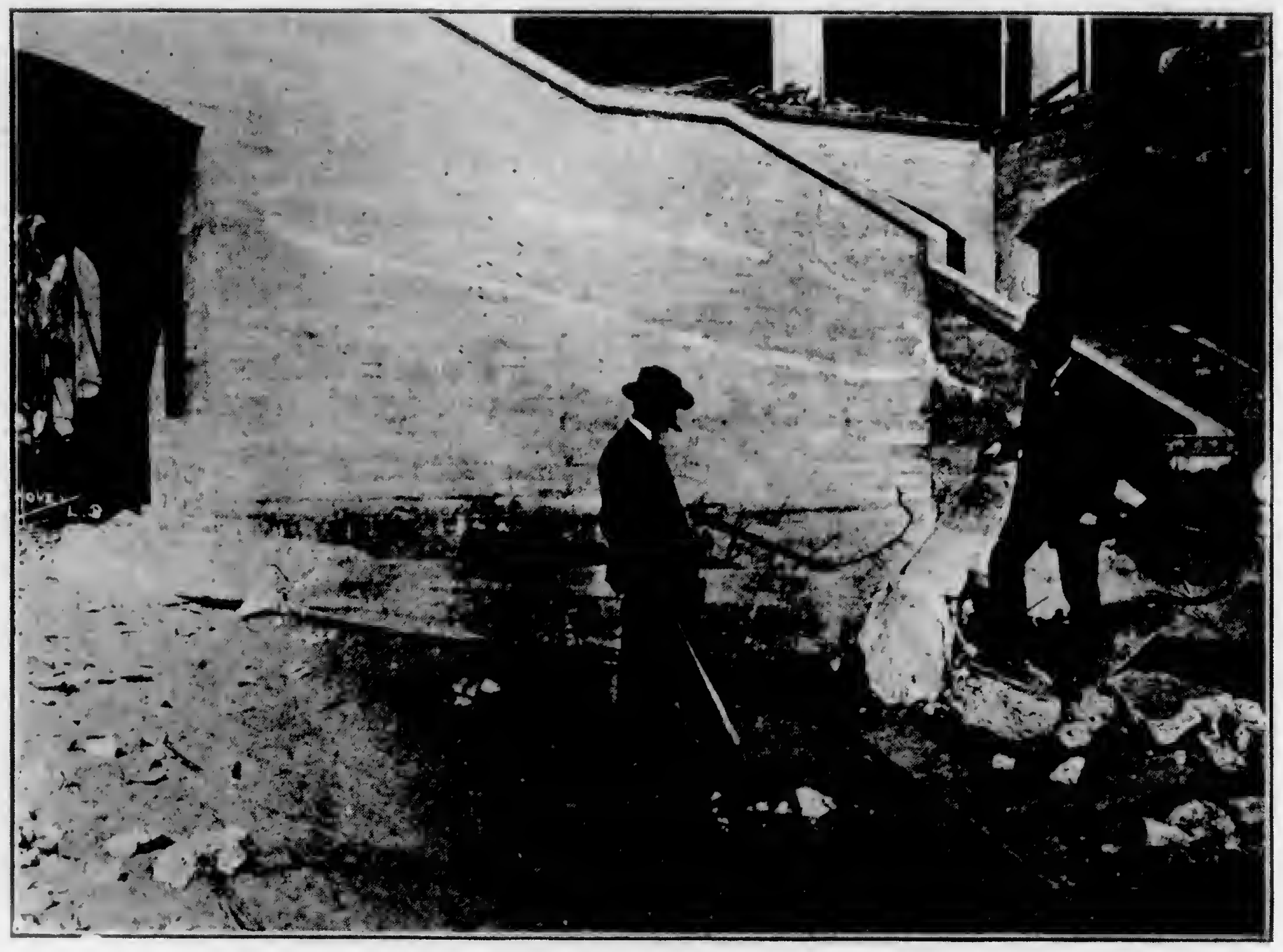


Figure 3. (Note Smooth End of Column)

The Failure of the Bixby Hotel

By JOHN B. LEONARD, C. E.

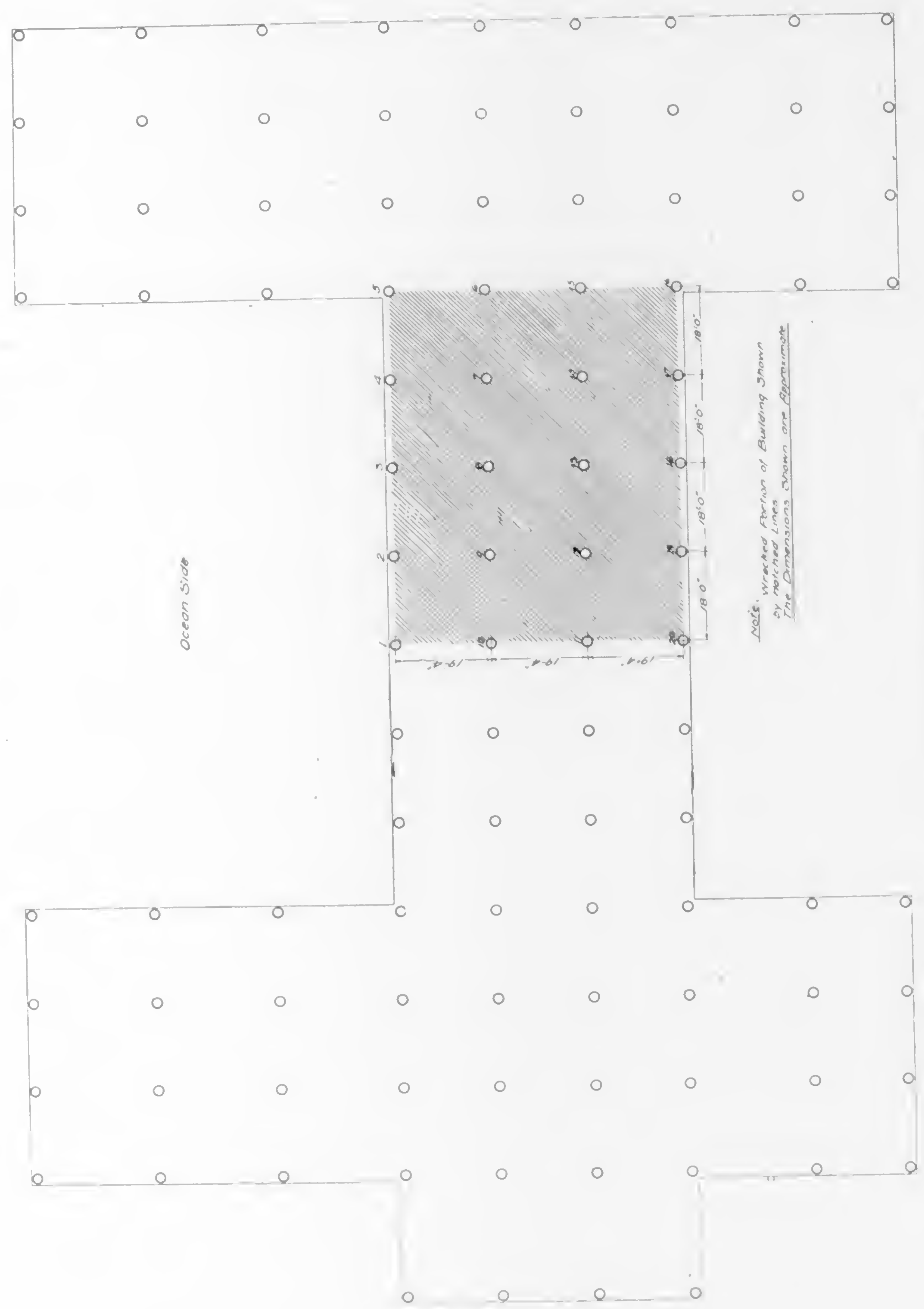
THE recent unfortunate failure of the Bixby Hotel, November 9th, at Long Beach, Cal., has aroused an increased interest in reinforced concrete type of construction. Knowing that the public is particularly anxious to investigate the subject, the writer submits the results of his investigation of the existing conditions together with some conclusions as to the probable cause of failure.

The location of the building is at Long Beach, a suburban town about twenty miles from Los Angeles. From the ocean the site has a clear exposure to the severest storms that may occur on the Southern California Coast.

Figure one shows the general plan diagram of the building, which, as will be noted, consists of two wings and a connecting portion. The part that failed is indicated by the section lining. The building has a total height of five stories, with a clear distance of eight feet four inches each above the second floor and of nineteen feet between the first and second floors. (All general dimensions of the building are as accurate as could be determined in the field by careful measurement with a two-foot rule.)

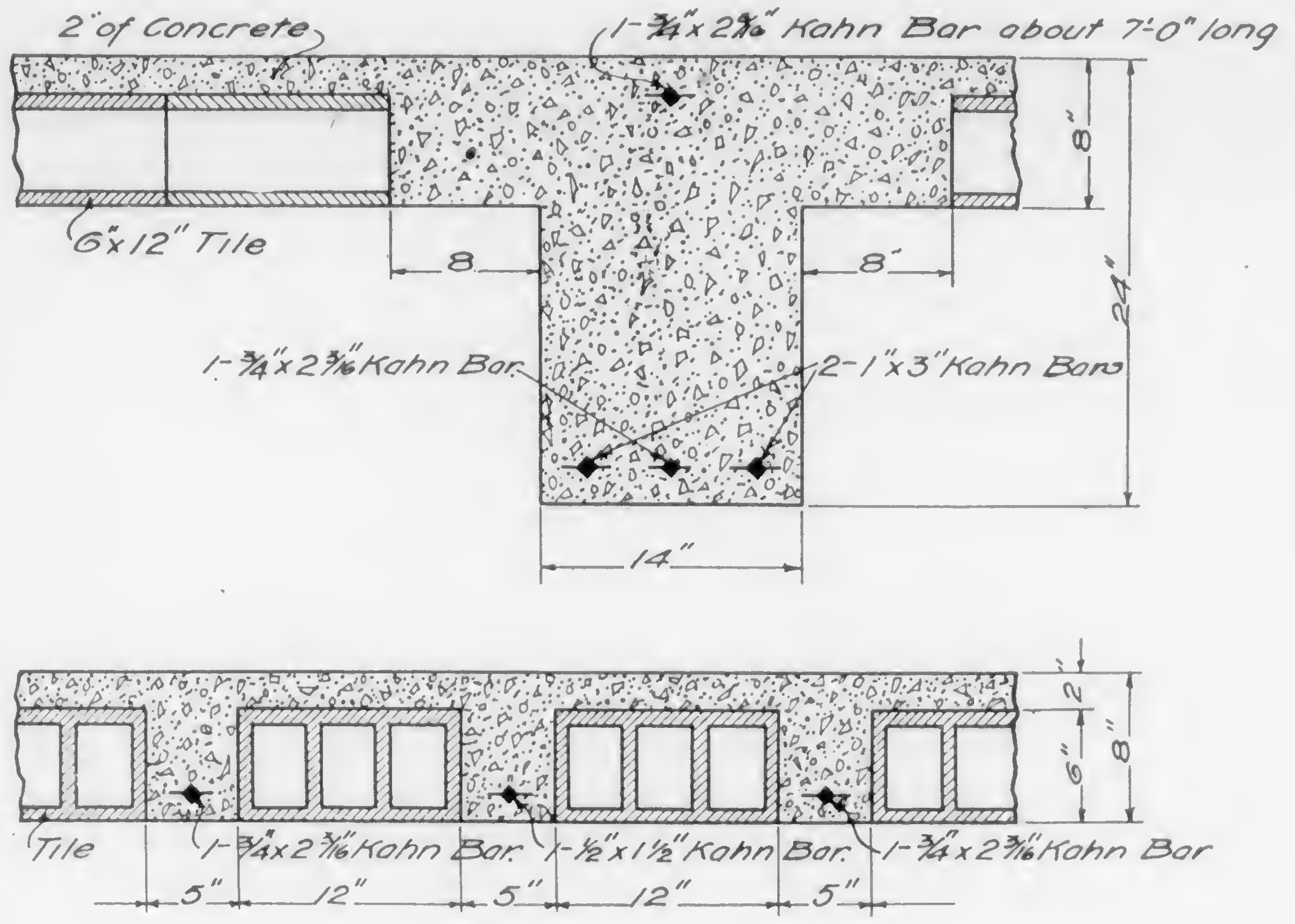
The foundations were placed upon a sandy beach at an elevation, so the writer is informed, of about two feet below low tide level and are six feet square. The basement floor was laid directly on the beach sand.

There is but one system of girders in each of the floors. These girders run parallel to the long dimensions of the wings and in the connecting portion in a direction normal to the wing girder. The roof construction over the connecting portion of the building consists of concrete girders dividing its area into rectangular panels. On these girders at the time of failure, there was being constructed a reinforced concrete slab four inches in thickness. On the wings the roof construction consisted of concrete columns supporting concrete girders


Ocean Side
18'0"
18'0"
18'0"
18'0"
Note. Wrecked Portion of Building Shown by Hatched Lines
The Dimensions Shown are Approximate

General Plan Showing Position of Columns

Figure 1



Typical Construction on First Floor.

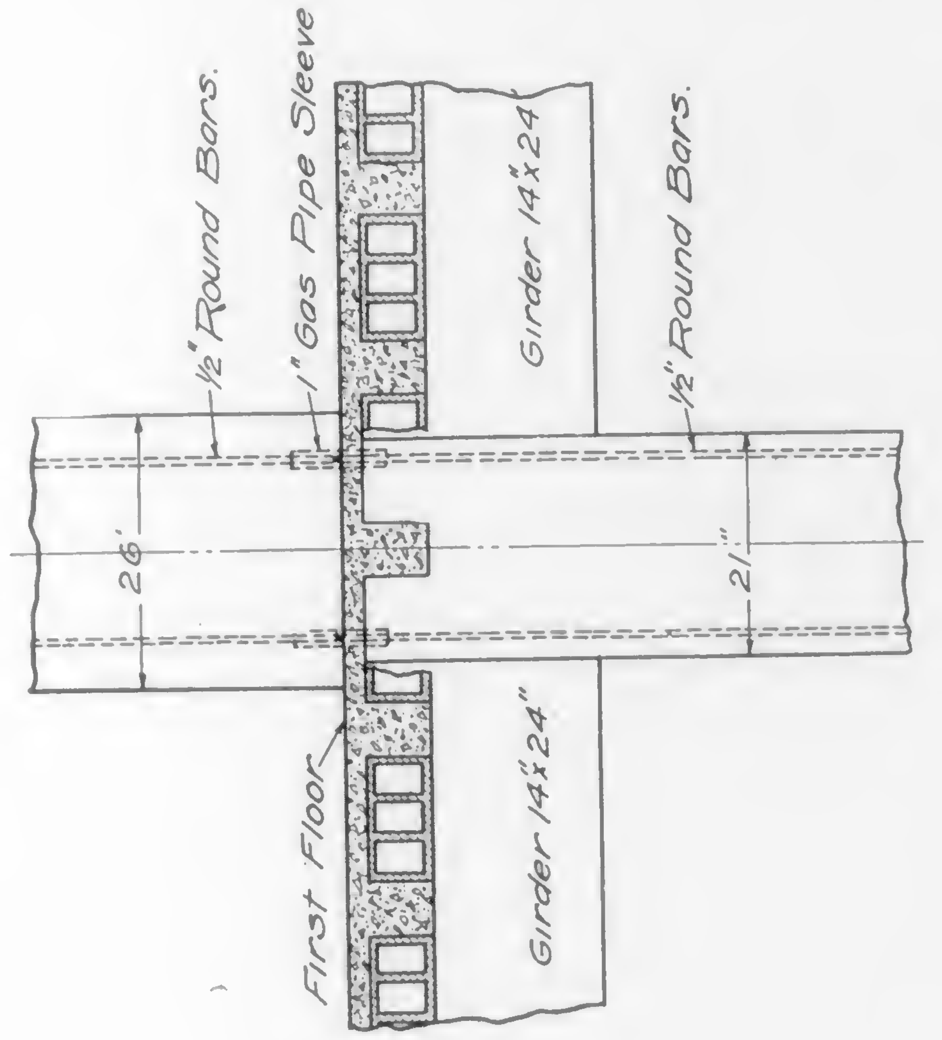
Figure 2

running parallel to the girders of the floor system. On top of the concrete roof girders, there were bolted wall plates to which were being nailed two by six-inch ceiling joists. The roof construction was to have been of timber frame covered with tile.

The girders of the first floor are fourteen inches wide by twenty-four inches deep, reinforced with three bars having a sectional area of 3.62 sq. in. On the other floors the girders are twelve inches wide by eighteen inches deep, and the Superintendent insists that they have the same reinforcement as on the first floor. The girders are constructed T shape, as shown by Figure two, and have 0.78 square inches of metal for continuity reinforcement, which projects about three feet six inches each side of the column center. None of the girders are provided with haunches or brackets.

The slab construction consisted of five inches by eight inches concrete beams placed seventeen inches center to center and reinforced alternately with bars having a sectional area of 0.38 sq. in. and 0.78 sq. in., respectively. Between the beams is a row of six inches by twelve inches hollow tile, which is placed in a line normal to the girders and parallel to the beams, the twelve-inch dimension of the tile being horizontal. The detail of this construction is shown in Figure two. On top of the tile was placed a two-inch layer of concrete which contained no reinforcement.

The columns are built of concrete and contain, usually, for reinforcement, four one-half inch round bars. In the wrecked portion, the basement columns are twenty-one inches square, while those of the first story are approximately round as shown in Figure three, being about twenty-six inches at the base and tapering to twenty-two inches at the top. Their reinforcement consists of four one-quarter inch square bars. The second story columns are twelve by twelve



Column Connection on First Floor of Wrecked Portion of Building. Note Absence of Tie Between Columns at Floor Level.

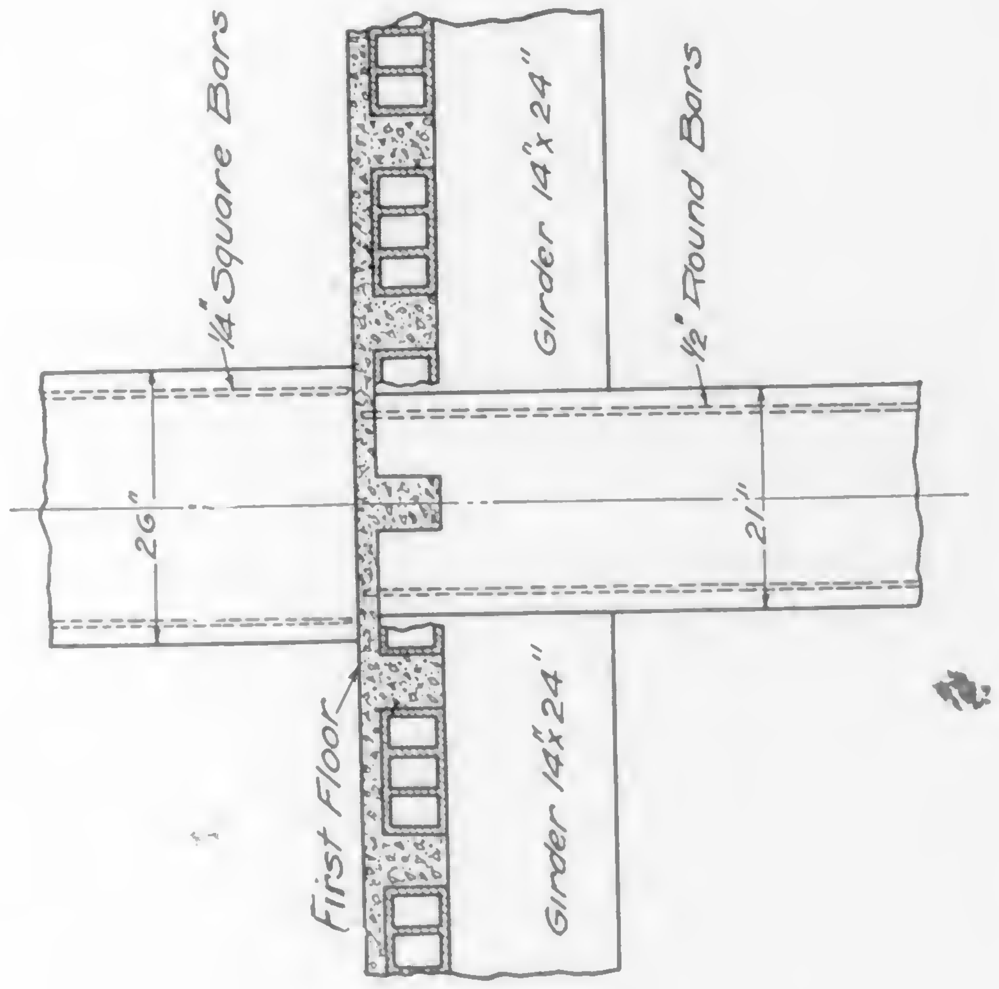


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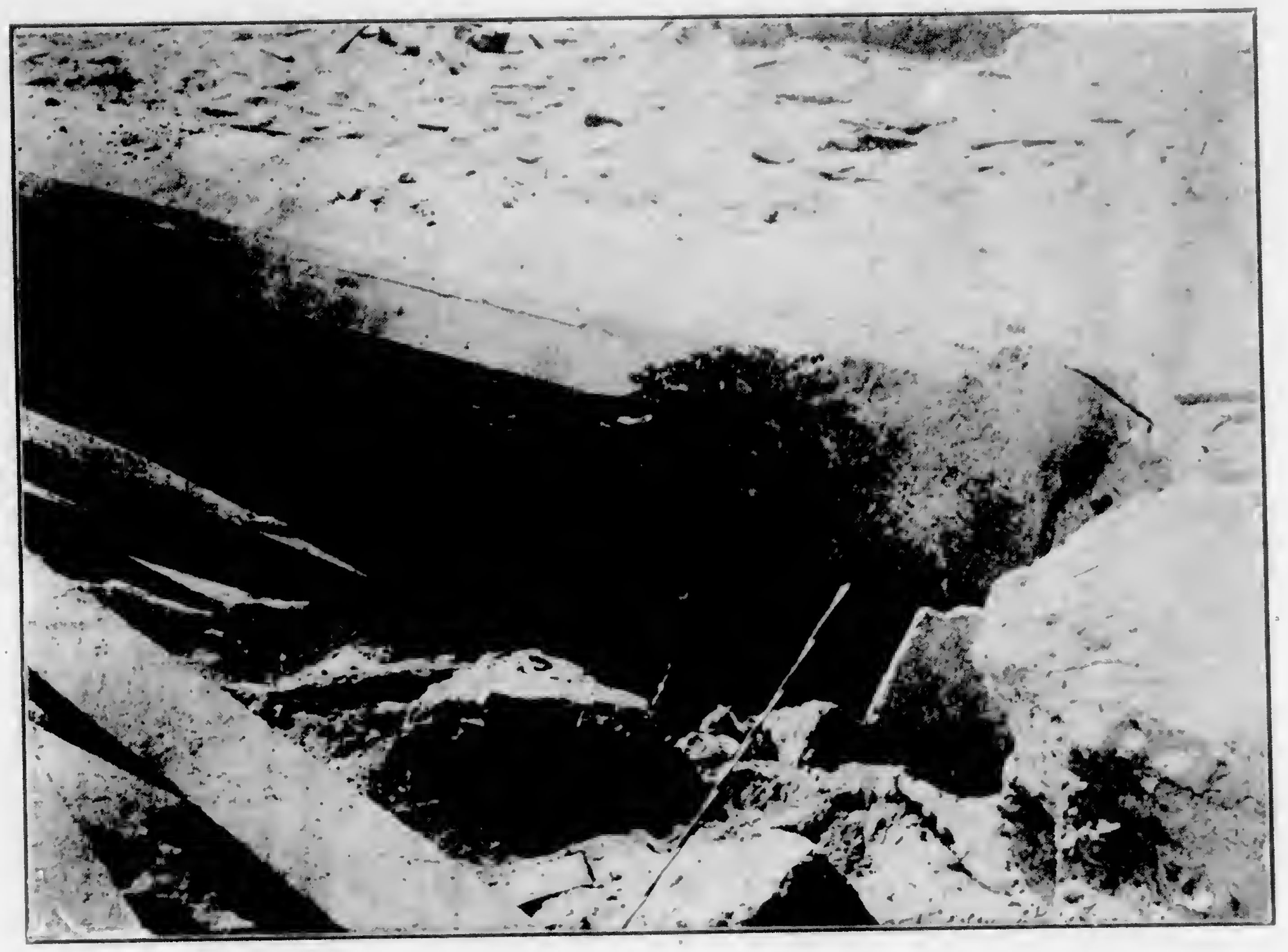
Figure 4



Showing Fractured End of First Story Column

inches, and the third, fourth and fifth story columns are ten by ten inches. Figure four shows the detail of the joint between the first and second story columns. In some cases, there was evidence of wire wrapping about one-sixteenth inch diameter spaced about sixteen inches; in other cases, there was no evidence of wrapping whatever. In several instances some of the bars were as far as six inches from the edge of the column and others only three-quarters inch, as can be clearly seen in Figure five. If the reader will carefully study this view, he will note the position of the rule which verifies this statement.

The rods in the columns at the floor levels are made to abut one another by means of a gas pipe sleeve. The ruins gave evidence that in some instances even this precaution was omitted, as can be seen in Figure six. In no case was there any evidence that reinforcement had been provided to enable the columns to transmit transverse moment to the girders and columns below. There was ample evidence that the work had been constructed by casting the column up to the elevation of the bottom of the main girders. A period of time had been allowed to elapse before the girders were fabricated. After a second interval of time, the construction of the column for the next story was commenced. This was apparent because of the smooth fractures which occurred at these places. Such reinforcement as was provided in the columns was insufficient to overcome the weakness of the lower joint and there was none at all at the floor level to safeguard the possibility of a weakness at this point.

In the wall columns, there was an eccentric condition of loading through the imposing of a sixteen-inch column on a twenty-one-inch column whose outside faces were flush.

The wall construction consists of a series of concrete spandrel beams with a curtain enclosure of double six-inch hollow tile.

The concrete was fabricated in the proportion of one part of cement, two parts of sand and three parts of gravel or rock. The gravel was screened and the coarser particles were crushed. A quarried rock was used in the construction of the columns. The sand was obtained from a nearby creek and such samples as were obtainable, showed it to be clean, sharp and coarse. The

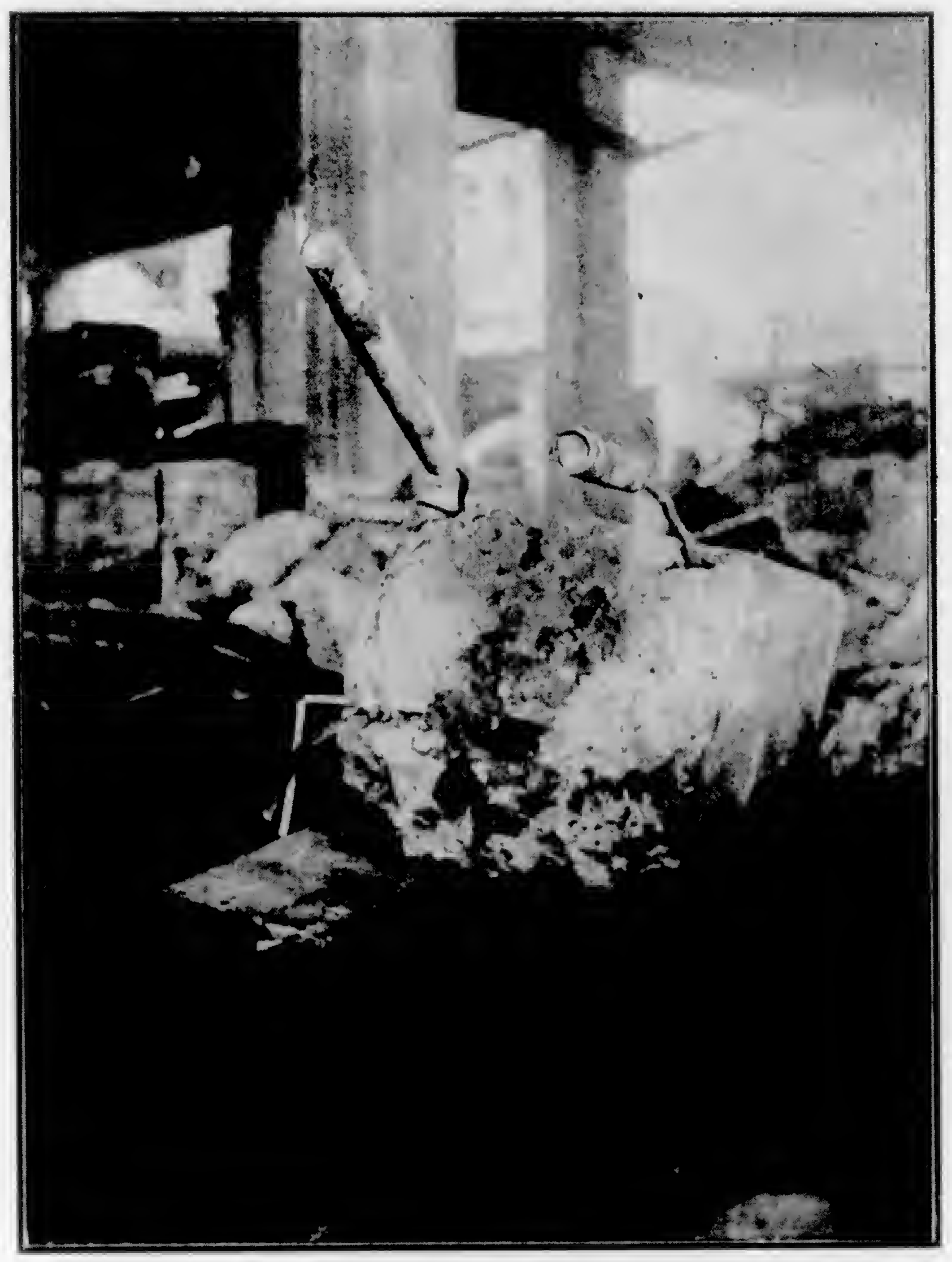


Figure 5

cement was the brand known as Golden Gate and is manufactured near Suisun, Cal. The character of the concrete, where it was placed in position with precaution to insure a solid mass, was of such excellent quality that there can be no suspicion of this failure being caused by an inferior quality of cement.

In one case, I am reliably informed, such carelessness existed in the placing of the concrete as to necessitate the removal of a column after the floors and columns above had been constructed. This reconstruction was accomplished by placing two two by four inch shores underneath the girders, one each side, and closely adjoining the column. The concrete was then removed for about half the length of the column and poured anew. This column can be seen in Figure six, and it will be noted that the column is not true to its original position.

The formwork appears to have been very lightly constructed, the uprights being two by four inches, ofttimes spliced midway of their length. The primary cause of the failure seems, from the best information obtainable, to have been the collapse of the formwork of the roof while the roof was being cast. The weight of the roof impinging on the fifth floor incurred a condition which the construction was unable to resist. The fifth floor was a little over two weeks old at the time of the accident. The constantly increasing load was sufficient to destroy each of the succeeding floors and to carry down with them all the interior construction.

The building was designed to carry a live load of forty pounds per square foot. The writer was unable to learn that there was any load even approximating this on the floors at the time of the accident. A calculation of the

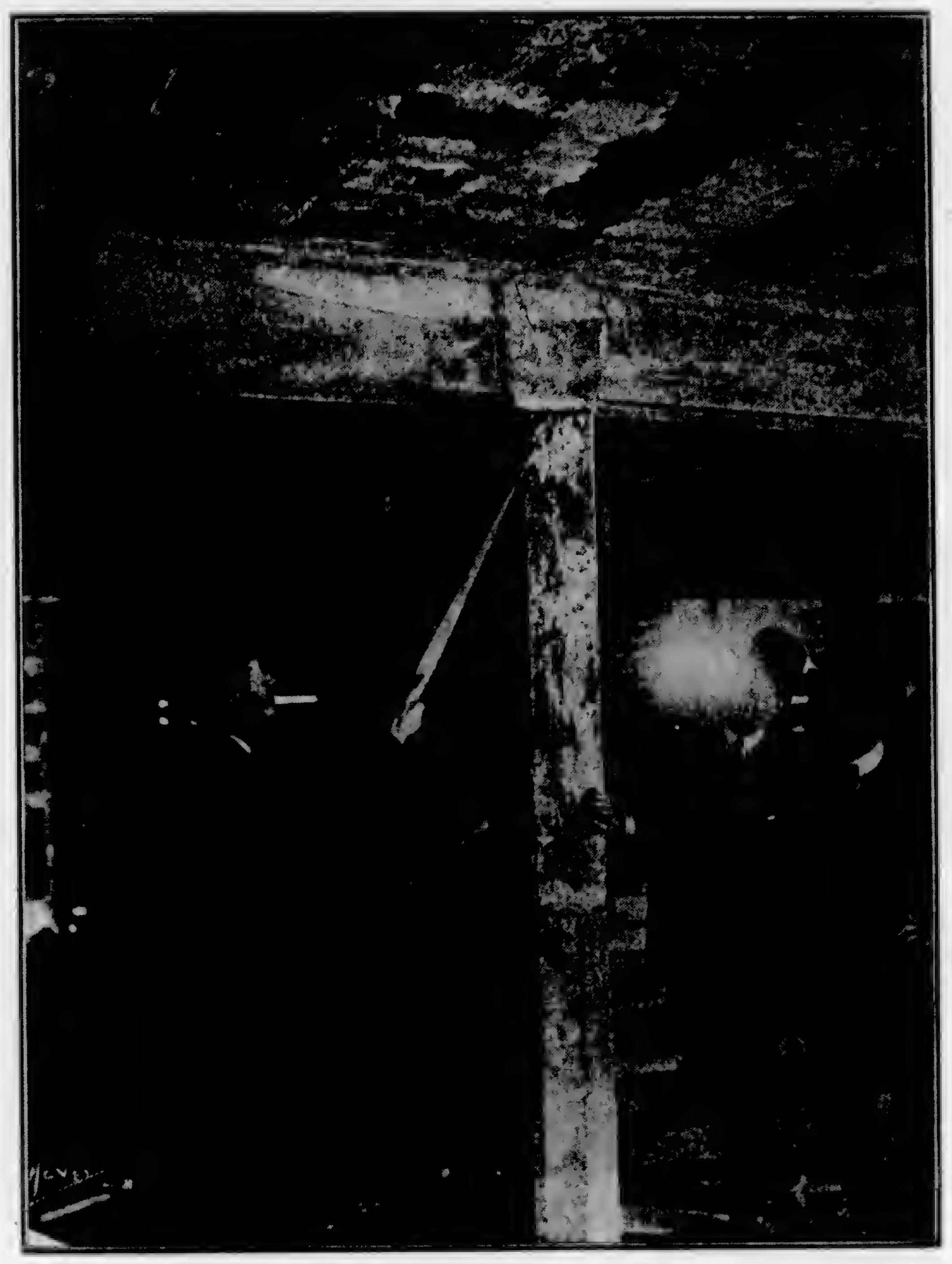
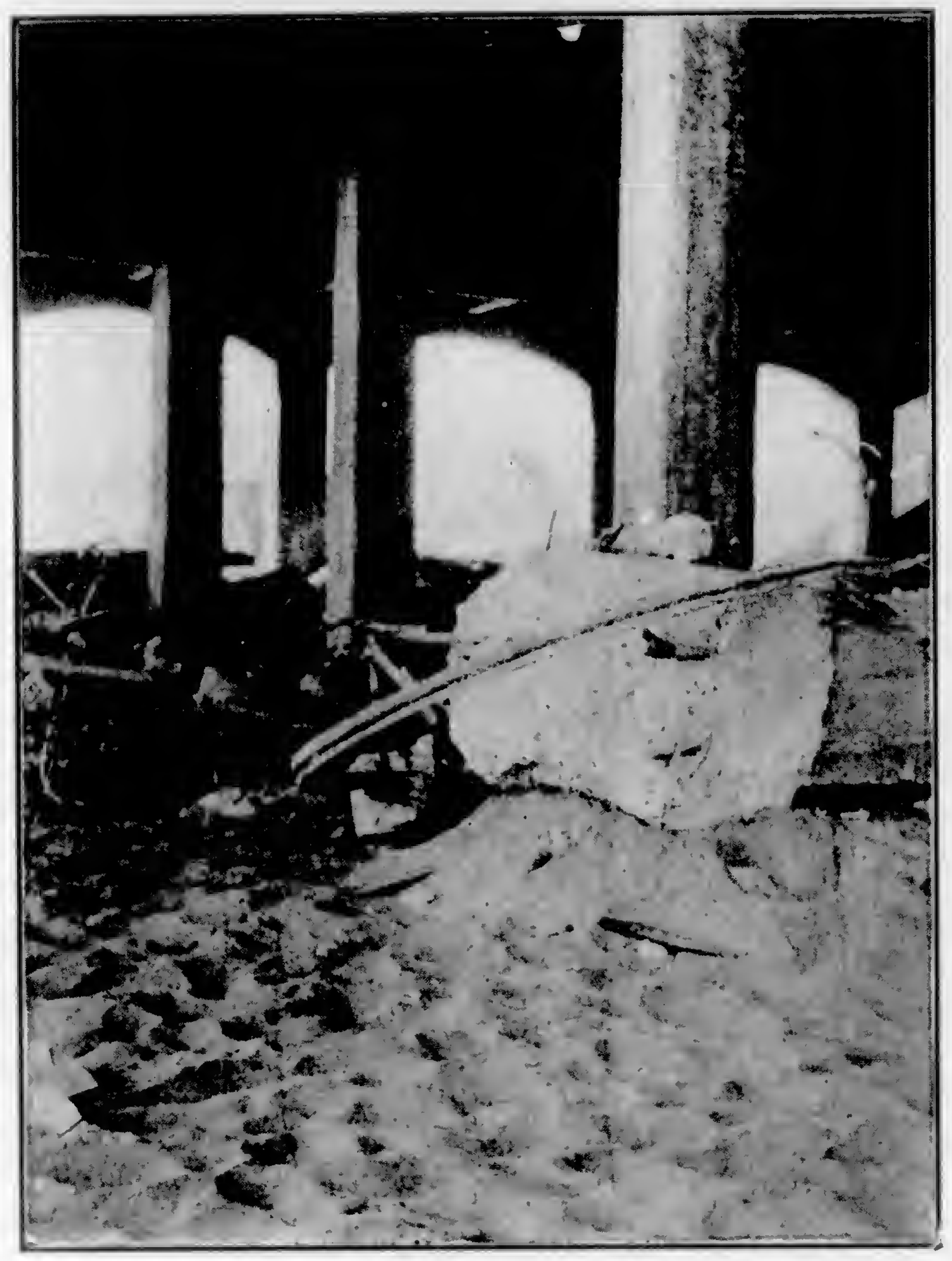


Figure 6

strength of the girders of the first floor in accordance with the parabolic theory shows that there would exist a fibre stress of about 11,000 pounds per square inch on the steel and 400 pounds per square inch on the concrete for live and dead loads. On the ten by ten inch columns in the third floor there existed a unit stress of about 750 pounds per square inch under dead load only. Assuming the live load of the roof to have been twenty pounds per square foot, there would have been a unit stress of 1100 pounds per square inch on the concrete. The building laws of San Francisco place a limitation of 450 pounds per square inch on concrete under such a condition as this.

It will be well to note that an attempt in construction has been made here that is not sanctioned by the most advanced constructors, that is, the elimination of transverse girders and the placing of entire dependence for horizontal transverse forces upon thin slab construction. The entire elimination of haunches or brackets together with their reinforcement is a serious sacrifice of lateral stability, particularly so in a location where a structure may be called upon to endure very severe wind conditions.

A building having steel columns resting one on top of another with nothing more than a dowel pin connection would inspire no feeling of security. It therefore, becomes difficult to understand why a concrete structure whose columns contain no more reinforcing material to give strength at the floor level than would be obtained in the above steel connection, should be cited as an example of failure of the reinforced concrete type. Again, imagine the designer running only a single line of girders between the above steel columns at each

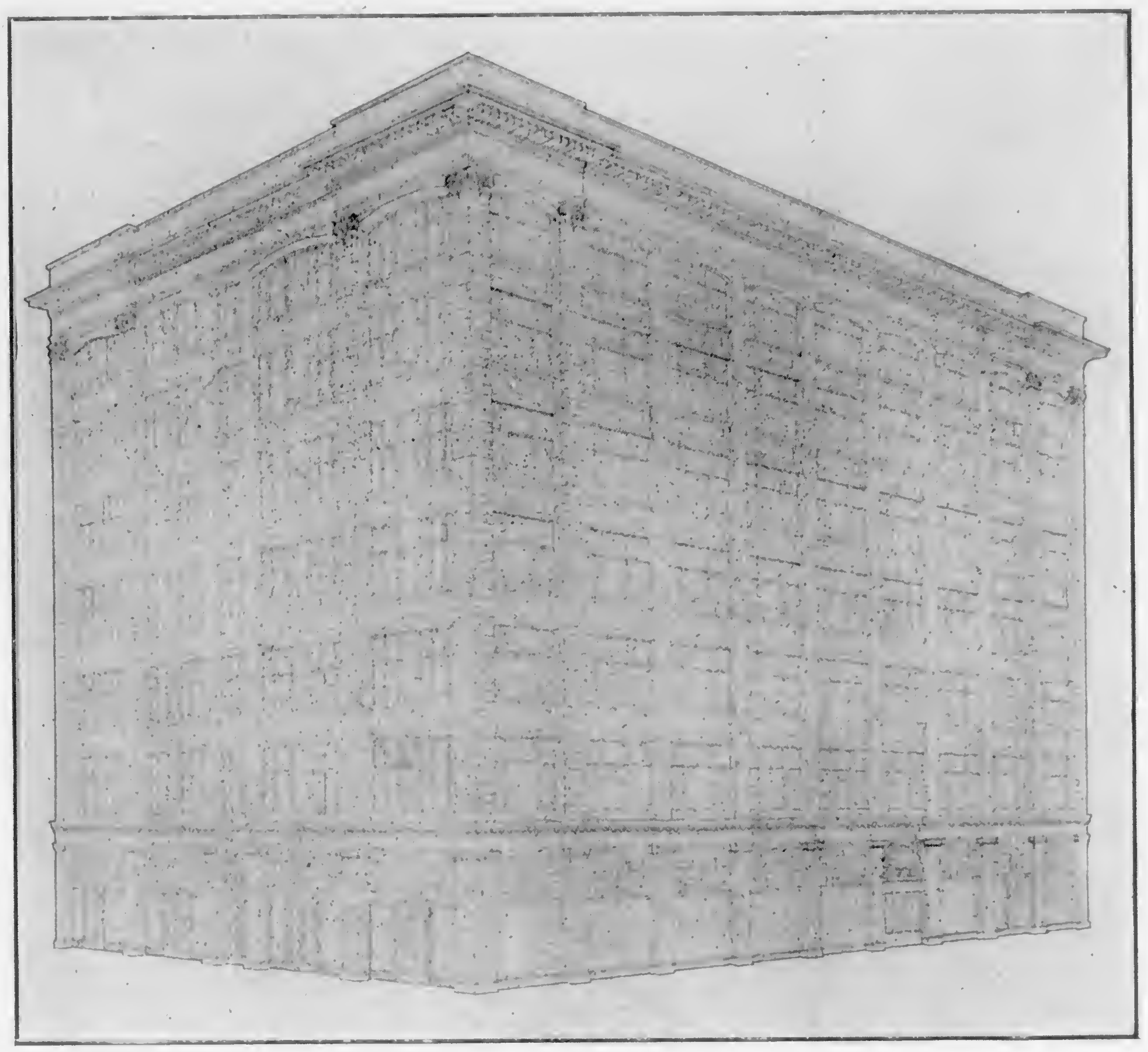


Showing Absence of Transverse Girders in Floor Construction

floor level in a five-story structure and the faults and weaknesses of the general design are apparent.

Only the opponent of reinforced concrete construction would dignify the columns of the Bixby Hotel, by classifying them as examples of this type of construction. It is true that they contain some metal, but the amount is so deficient and the placing so careless and inefficient that they can never develop the strength that columns of such dimensions should possess, and will have when properly reinforced. The defects existing in the columns would have contributed much less toward the magnitude of the disaster had the proper transverse girders been included in the construction. In fact it might reasonably be assumed that such girders would have confined the failure to a very small area and might have stopped it at the fifth floor.

The ruins of the Bixby Hotel show clearly that great care must be taken in the design and execution of such structures. They also confirm the belief that when these precautions have been taken, reinforced concrete contains the merits and security that have been advanced in its favor.



The Mark Sheldon Building of Reinforced Concrete, now under construction
Benjamin G. McDougall, Architect *Jno. B. Leonard, C. E., Consulting Engineer*

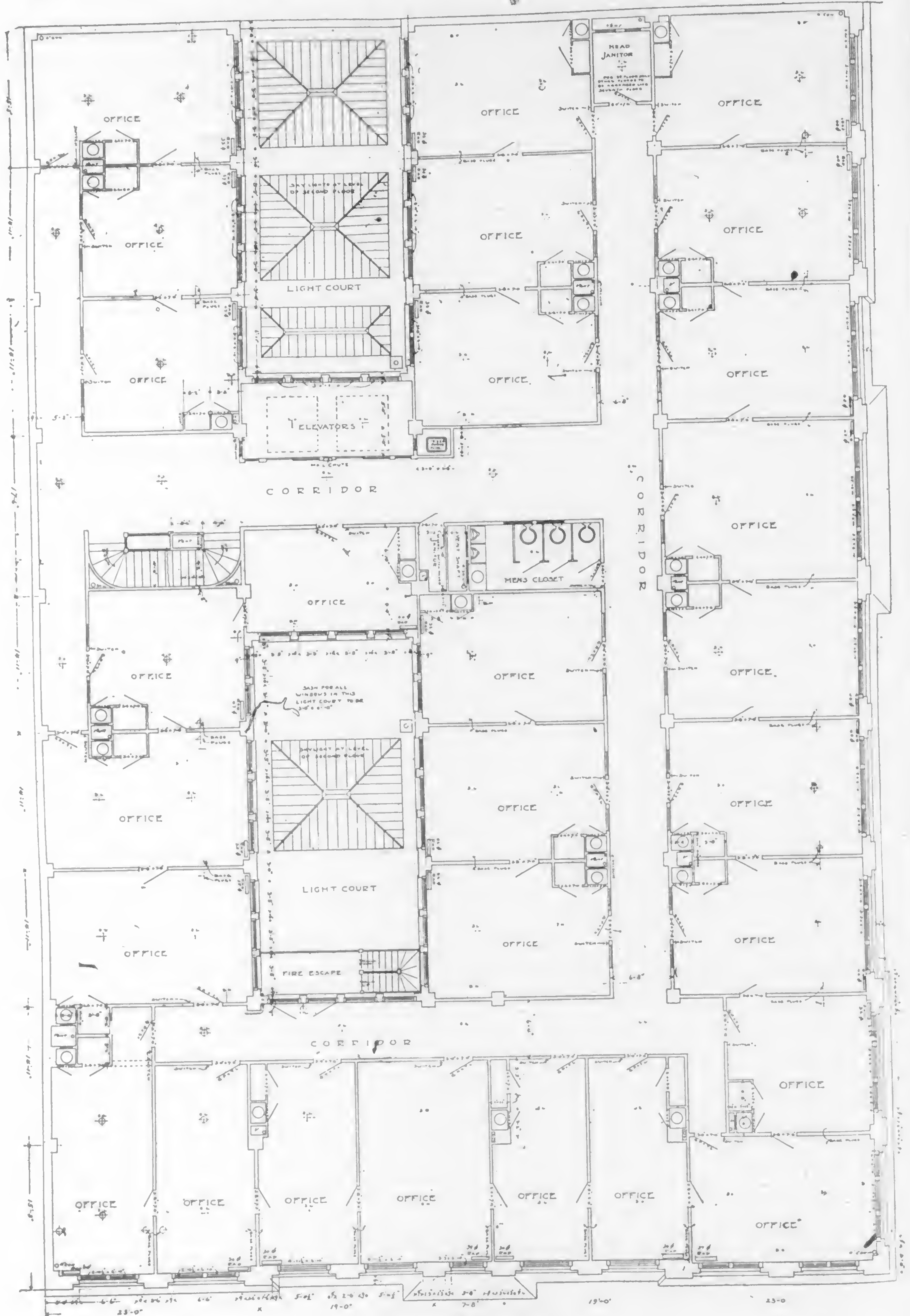
Seven-Story Reinforced Concrete Office Building

By BENJ. G. McDOUGALL, Architect

AMONG the leaders in the building of the New San Francisco are the Mark Sheldon Company, who are to erect at the southeast corner of First and Market streets a seven-story office building. It is to be of reinforced concrete, faced with buff terra cotta, and will be 137.6 feet deep with a frontage on Market street of 91 feet 8 inches.

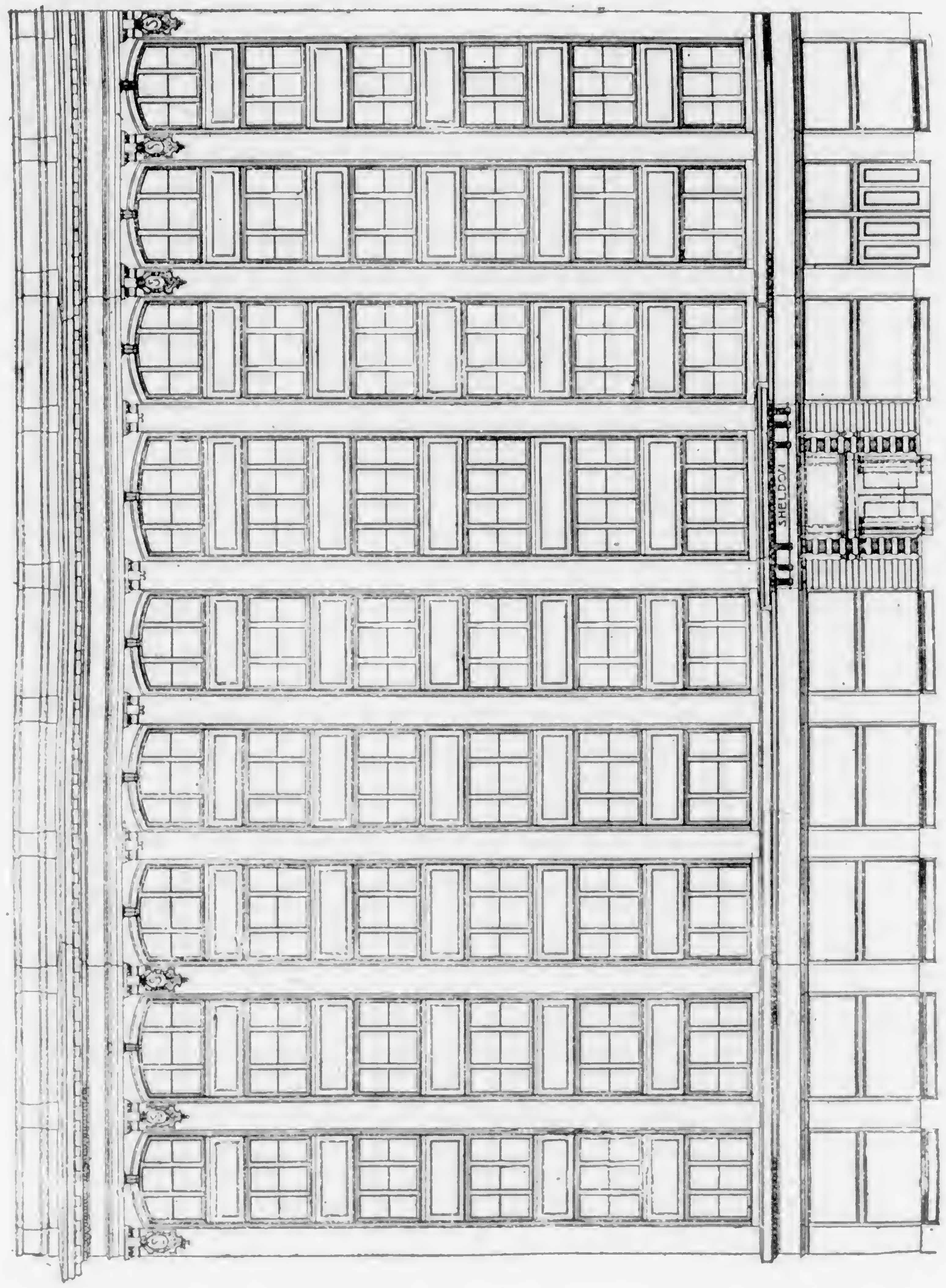
The exterior is treated in a style that has been evolved for office buildings in this country—and which lends itself well to a structure that must have abundance of light. The ornament has been concentrated at the first story and at the cornice. The effect of repetition is broken by a slight offset of the two bays at either end of the facade, these breaks being emphasized by the addition of cartouches immediately below the capitals of the three end pilasters.

The ornamental treatment in the first story is confined to the entrances to the offices which occupy the six upper floors of the building. The main entrance which will be on First street is given a simple Doric treatment, with banded columns supporting an entablature that ties in and lines up with the heavy belt course which marks the top of the first story. The Market street side, while a little smaller, is treated in the same general style, having pilasters instead of columns—the entablature being the same as for the main entrance.

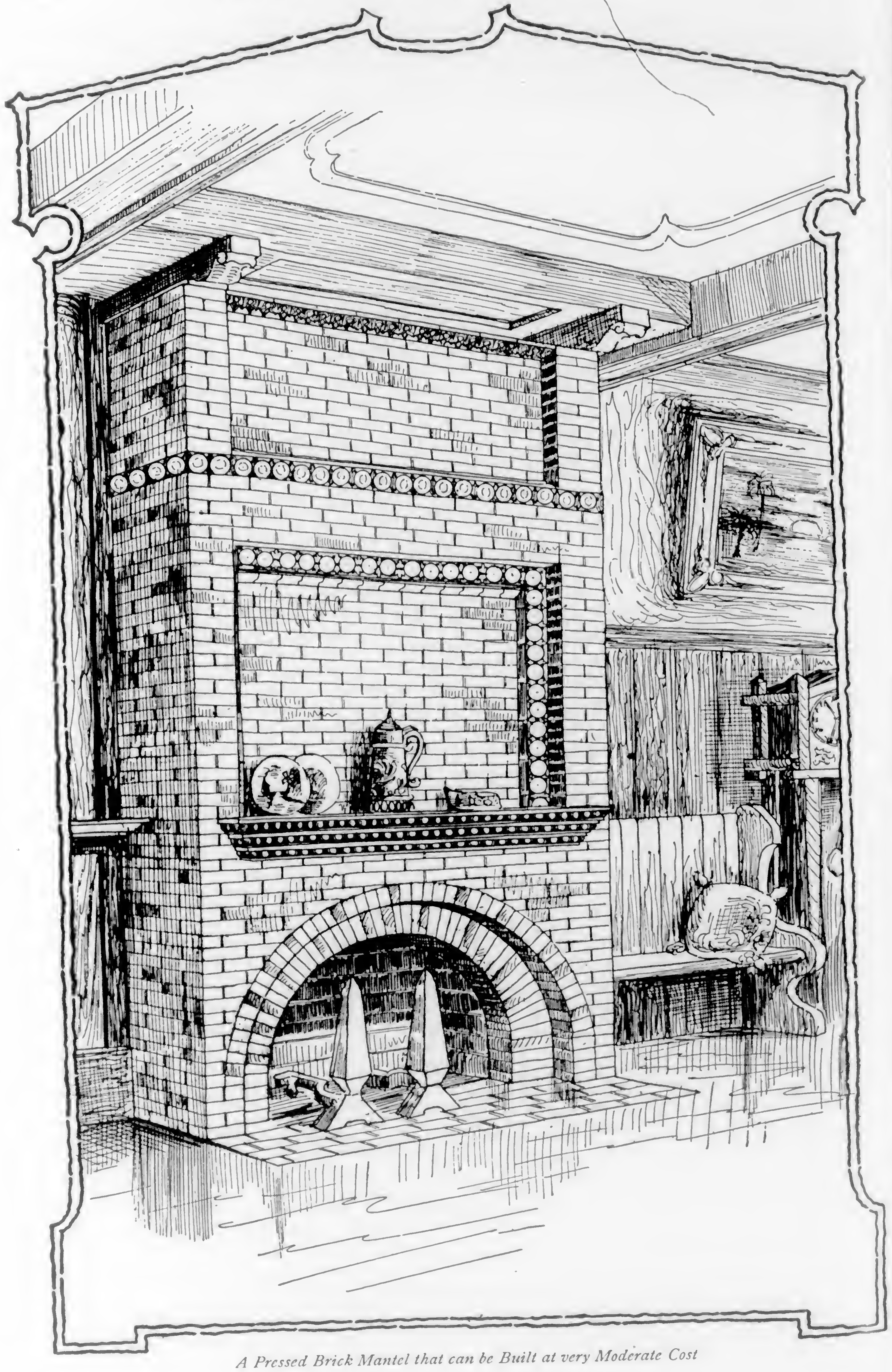


TYPICAL FLOOR PLAN
SCALE 1/8 IN = 1 FT

BUSINES PREMISES FOR THE MARK SHELDON COMPANY. . S.E. COR. 1ST & MARKET ST'S., SAN FRANCISCO.
BENJ. G. McDOUGALL, ARCHITECT, 417 MONADNOCK BUILDING, SAN FRANCISCO



Market Street Elevation of Mark Sheldon Building, San Francisco
Benjamin G. McDougall, Architect



A Pressed Brick Mantel that can be Built at very Moderate Cost

Terra Cotta and Brick

The Fireside

By W. E. DENNISON, President of the Steiger Brick and Terra Cotta Company

WITH the approach of winter naturally come thoughts of shelter. The prudent man looks first to his roof. He knows that without shelter there may be no comfort. When Boreas slams the shutter and Pluvius dances across the roof, what joy comes to the household if no shingle rides the wind and every tile is tight.

Beneath a staunch roof no feature of the home has contributed more to the cheer of man than the fireside. Remember this, the careful man lays in his winter's fuel before the sun looks with oblique and dubious warmth from the winter solstice. Then with garnered fruits of his sleeping field may the wise man draw close the domestic circle about the blazing hearth and enjoy the sweets of his summer's toil. Thrice happy he if the old song should apply:

"He never cares to wander from his own fireside;
He never cares to ramble or to roam.
With his children on his knee,
He's as happy as can be;
There's no place like home, sweet home."

And now come memories trooping fast, bringing a wealth of happiness past. The gnarled and knotty log, defiant of the wedge and maul, is dragged across the oaken floor. The wintry blast rushes through the hall with a wail for the dismembered monarch of the forest and howls in anger when the door is closed. The andirons are hustled aside; the ashes and coals raked forward; over and over is rolled the unwilling one and the snow dropping from its frozen sides hisses on the hearth. At last it bumps against the chimney back. The blazing fagots and red-hot coals are heaped against the back log's sputtering hulk. The andirons are piled high with dry limbs. The flames leap around the blackened kettles swinging on the crane. Savory odors fill the room and almost let the supper's secret out. Potatoes are buried in the coals while impatient tots dance about unmindful of their mother's warnings and the flying sparks. The surly old back log finds willing recruits in the crackling hickory limbs, all rebelling against the compelling cheer of that glorious fire. Many a shout, "A coal's on the carpet," attests the accuracy of the hickory sharpshooters. Then the horny-handed son of toil with dignified deliberation picks up the impious coal; dances it on his naked palm; throws it back to the firing line and saves the rag creation. No Turkish rug can ever down the memories of those rag-carpet days.

At last the housewife's fork attests the fact that the potatoes are done. Little hands with childish slaps contend for the honor of drawing them from their smoking bed. The mysterious kettles are emptied into the great white tureen and platters. Supper is ready. Around the white board gathers the family. Mother, flushed with her labor of love, endeavors to quiet those ravenous children, while father, the great provider—the man of mystery, the one who subdued the back log—bows his head and asks a blessing on them all. Before that blessing could possibly arrive, how well remembered is sister's sure kick to keep brother from getting the first potato.

After the repast, the old folks take to the chimney corner, he to read from the Weekly Tribune the speeches of Lincoln and Douglas, she to mend and knit while the children crack nuts on the limestone hearth or parch corn in the skillet over fresh drawn coals. And then the sharp cider from the frozen barrel on the north side of the house. "Children, it's time for bed!" brings forth the flannel night gowns to warm before the fire, and "Now I lay me down to sleep" in the old trundle bed, closes this simple picture of an old-time fireside.

* * *

Enduring Brick

Superiority Claimed for the Ancient Building Material

UNDER the above heading there is an interesting addition to current literature on brick, by Mr. Albert A. Gery, of the United States Brick Company, Reading, Pa. It was written to and published in the New York Sun of August 18, in reply to an editorial entitled "Falling Brick," which the Sun published August 5, and which Mr. Gery states, while intending to be scientific in its nature, was a conclusion drawn from wrong premises. The editorial begins by commenting upon the recent drop in the price of brick in New York City, coupled with the prediction that it will not rise again, and then deplores the consequent depreciation in the value of all brick buildings as a public calamity. Mr. Gery's reply to the editorial states that nothing has happened but the scotching of another trust, which he considers a public boon.

"Let us note at the threshold," he continues, "that the brick walls of a building are the least expensive part of it, all the bricks laid in place amounting to less than an average of 10 per cent of its cost. A rise or fall in the price of brick, therefore, is so inconsiderable an item that its influence in encouraging or retarding building is insensible.

"The price of brick in New York for the last six months has been abnormally high as the result of a mischievous combination of brick manufacturers on the Hudson River, the increased price in due course stimulating the output and breaking the combination, to the general public relief.

"Brick is the least variable in price of all commodities, because the prime condition of raw material is not a factor. With inexhaustible supplies of shale and clay and constant and unlimited markets, there are no elements involved but labor and fuel, and the modern method by which the bricks are handled and heated but once instead of twice or thrice, has reduced the cost to such an extent that there is no chance of a substitute for this enduring, convenient and economical commodity, which neither moth nor rust can corrupt, and which is insensible to the ravages of fire and time. Bricks have stood the test of ages. The history of Babylon and Nineveh, inscribed upon their faces thousands of years ago, are as legible today as when the text was written. The old Roman walls of Vienna, discovered in recent excavations, disclose the bricks in perfect condition, while the cement in which they were laid has crumbled into dust.

"Making bricks is the oldest of all the industries, and the bricks made for the Tower of Babel were produced by the same crude methods as those now in use on the Hudson River. It is the one undeveloped industry of modern times, and offers the greatest opportunity and inducement for genius and capital. The present price is good enough for modern plants with a product greatly superior in quality to that of the antique yards that now supply your market.

"The purpose of the article referred to was not so much apparently to depreciate brick as to commend cement, which it declares is displacing brick all over the country. This statement is so gross an error that the Sun will not be willing to stand sponsor for it after even a slight investigation. The substitution of poured cement is entirely experimental, and the extent of its use does not make the slightest impression upon the brick market. According to the statistics of the United States Geological Survey, the value of clay products stands third among the natural industries of the country, amounting to $120,000,000 a year, being exceeded by coal and iron alone, and exceeding in value all the gold, silver, copper and petroleum together. The value of cement has not been proved as a building material, and it has not been shown that it will endure the vibrations to which the walls of town houses are constantly subjected. The San Francisco buildings which sustained the temporary shock of an earthquake were sustained by the iron frames, and not by the cement which covered them. The National Builder says on this subject:

" 'It is a mistake to suppose that concrete made with Portland or any other cement is absolutely a safe material to build every sort of work with, or that as now employed it is a perfect fireproof substance. There have been a number of serious failures of concrete construction, commencing with the fall of three floors of the Hotel Oswego, which fell last October; a warehouse in Pittsburg, belonging to Kaufman Brothers; the Wonderland Theater of Detroit; the Bell Telephone Company's building in Philadelphia; the Paddington apartment building, Chicago; the Conservatory apartment, Boston; the Johnson Service Company's building, Milwaukee, and the Lawrence Savings Bank of Newcastle, Pa. These are only a few of the failures, the most prominent. We could name a number of others of more or less magnitude. It is not likely these failures are simply because of the concrete being insufficient. More probably the faults lay with the methods, both of using the material and the mode of construction. As a fireproofing material concrete may be all right, but the many failures in which this material has been depended upon throws suspicion on its efficiency. Perhaps the failures are due to bad methods, careless workmanship or insufficient inspection, or all of these combined.'

"There is this thing that must be taken into account with concrete construction: Cement making is a delicate process, and even in the most carefully managed factories it is impossible at all times to secure absolute uniformity in the product. Of course there are constant tests at the factory, for the makers of a recognized brand realize how essential it is to keep their product up to the highest standard. Cement deteriorates rapidly under certain conditions, and new and untried brands are constantly coming into the market. The engineers of a great work have their own tests, which they regularly apply to the cement they use, and so they protect themselves. With the ordinary job there are no facilities for testing, and the cement is used without question as it is delivered. Sometimes a batch of bad cement will find its way into a job. Upon this weak and slack material may be erected a massive superstructure that will collapse with appalling disaster. Then it will be found necessary to go into the entire question of concrete construction, and put it under stringent regulation. In our craze for novel methods we seem to forget that concrete is not like stone or brick masonry in having the test and approval of the centuries."

Chemistry Building, University of Wisconsin, Faced with Sand-lime Brick

Sand-Lime Brick for Building

WHILE the manufacture of sand-lime brick is a comparatively new industry in this country and at present is attracting more than ordinary attention of contractors and builders, it might be of interest to know something of the nature and manufacture of the brick. There are in this country more than 100 plants at present making sand-lime brick successfully. One of these is represented on the Pacific Coast by the W. F. Barnes Commercial Company of San Francisco. The brick is made from sand and lime is used as a binding material. It is shaped in moulds. It is dried or cured in steam cylinders under a pressure of about 120 pounds in about twenty-four hours. In Germany in the earlier manufacture of sand-brick they were sun-dried, the process requiring several months. From recent tests made by L. S. Anderson, formerly of Wellsville, New York, now of Jackson, Michigan, the following results were gained:

After drying the brick to constant weight, the bricks were weighed, and placed in water an inch deep, remaining there forty-eight hours, and again weighed with the following results:

No. 1, Detroit clay brick, dry, 4 lbs. 6 oz.; wet, 5 lbs. 4 oz.; absorption, 20 per cent.

No. 2, Toledo clay brick, dry, 4 lbs. 12 oz.; wet, 5 lbs. 1 oz.; absorption, 19 8-10 per cent.

Jackson Sand Lime Brick:

No. 1, dry, 5 lbs. 9 oz.; wet, 6 lbs. 1 oz.; absorption .09 per cent.

No. 2, dry, 5 lbs. 14 oz.; wet, 6 lbs. 4 oz.; absorption, .06 4-10 per cent.

No. 3, dry, 5 lbs. 9 oz.; wet, 6 lbs. 1 oz.; absorption, .09 per cent.

No. 4, dry, 5 lbs. 14 oz.; wet, 6 lbs. 4 oz.; absorption, .06 4-10 per cent.

Mr. A. B. Stevens, City Engineer, accompanied Mr. Anderson to Ann Arbor and witnessed the tests made at the University.

Tests of tensile strength were made with knife edge supports, 7 inches apart, from centers, with knife edge above, in center.

Detroit sand lime brick broke at 635 lbs. pressure.

Piece of same, 4x4 in., crushed at 17,200 lbs. pressure.

Detroit clay brick broke at 1640 lbs., was not crushed.

Toledo clay brick broke at 1570 lbs., piece 3¾x3⅞ crushed at 37,860 lbs.

Jackson sand-lime brick, No. 2, broke at 1330 lbs. pressure, and a piece 3¾x3⅞ crushed at 38,100 lbs.

Jackson S. L. Brick, No. 4, broke at 1500 lbs., and a piece 3⅞x3⅞ crushed at 42,540 lbs.

The above bricks, made by the Jackson Pressed Brick Co., were only one week old and would have made a better showing had they been older. The tests were considered highly satisfactory by Mr. Stevens, and also by Professor Tilden, instructor of civil engineering, under whose supervision the tests were made. They will be used in the city water purification plant now under construction.

The cut shows the Chemistry Building of the University of Wisconsin at Madison, Wis., which is faced with sand-lime brick, and is one of the best illustrations of the beauty and stability of the brick, which gets harder as it grows older. It is one of the newest buildings of the University, having been erected about three years ago. It is a fine example of what can be done in the way of ornamentation, and artistic treatment with this new building material. The sand-lime brick develops a very handsome building, whether it is used in its entirety or in combination for decorating window caps, coping, or for facing.

* * *

Brick Bungalows

A new type of residence architecture is being introduced in the city of Denver, Colo., in the shape of what is locally called "brick bungalows" of attractive style and finish. The prime mover in the undertaking is C. K. Ingram, who is having plans prepared for the first dozen, to cost on an average about $3500 each. The houses are unusally low, with broad and deep verandas as part of the house, and not merely as an incidental attachment. The materials for one of these cottages are cream brick set in bright red mortar and trimmed in red terra cotta. A roof with wide spreading eaves is also to be painted in bright red. A massive columned porch will adorn the front. Both within and without the red and cream tints will be carried out. There will be fireplaces in the principal rooms and the finish will be in warm tinted oaks. The ceilings will be paneled in oak, with the heavy beams of "mission" architecture. The bungalows will be of all sizes, ranging from those with four rooms and kitchen up to those accommodating families of half a dozen or more.—Ex.

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Bricks from Petroleum

A foreign correspondent of the Department of Commerce and Labor writes that Professor de Humy, French scientist, has invented a process by which petroleum can be converted into solid bricks as hard as anthracite coal. Common petroleum oil, it is asserted, has been thus solidified, and the blocks in burning give off an intense heat and are slowly consumed. One ton of solid petroleum used as fuel is said to be equivalent to thirty tons of coal. The comparative cost of the two forms remains to be ascertained.—Richmond Leader.

Effect of Moisture on the Strength and Stiffness of Wood

VERY little is definitely known about the influence of moisture on the strength of wood, even by those experienced in handling the material. Since the whole subject is one of great importance, the Forest Service has been making a thorough study of it during the past three years and is about to publish the results of his investigation in an exhaustive technical bulletin entitled, "Effect of Moisture upon the Strength and Stiffness of Wood."

The chief points presented by the study are:

1. The relation of moisture to strength follows a definite law which can be graphically expressed. Proper drying very greatly increases the strength of all kinds of wood, the amount of increase in strength depending upon the species and the dryness. The increased strength given to green wood by thoroughly drying it, is so great that it will surprise many. For example, the strength of a piece of unseasoned red spruce may be increased over 400 per cent by a thorough drying at the temperature of boiling water. Strength decreases again, however, as the wood reabsorbs moisture. Air-dried wood, protected from the weather, and containing 12 per cent of moisture, is from 1.7 to 2.4 times stronger than when green, varying with the species. Stiffness is also increased by drying. These conclusions, however, are drawn from small-sized pieces not exceeding 4 by 4 inches in cross-section such as are used in vehicle work, tools, etc. Large timbers require years of drying before the moisture is reduced to the point where strength begins to increase. It must also be taken into consideration that more or less checking always occurs when large timbers dry; and if this checking is excessive it may cause weakness to counterbalance, partially or entirely, the strength gained in drying. Consequently it is not safe to assume that the average strength of large, so-called seasoned timbers is much greater than that of green or wet ones.

2. The fiber saturation point of a number of species has been determined. This point, which varies with conditions and species of wood, designates the percentage of water which will saturate the fibers of the wood. It has been found that, under normal conditions, wood fiber will absorb a definite amount of moisture; beyond this the water simply fills the pores of the wood like honey in honey-comb. Only that water which permeates the wood fiber has an influence upon the strength. For the following species, the saturation point occurs at the given percentage of moisture based on the dry weight of the wood:

Longleaf pine	25	per cent moisture
Red spruce	31	per cent moisture
Chestnut	25	per cent moisture
Loblolly pine sapwood	24	per cent moisture
Red gum	25	per cent moisture
Red fir	23	per cent moisture
White ash	20.5	per cent moisture
Norway pine	30	per cent moisture
Western tamarack	30	per cent moisture

3. Prolonged soaking in cold water does not reduce the strength of green wood below that of its fiber saturation point, provided it remains in perfect condition. When wood has been dried and is resoaked, it becomes slightly weaker than when green.

4. Wood soaked in heated water absorbs more moisture because the amount of water which the fiber will contain is increased. This causes a reduction in strength and stiffness, as in wood that is heated or steamed for bending.

Clay

By W. E. DENNISON

Men are but gilded loam or painted clay.—RICHARD II.

WHEN Noah stood on Ararat,
His foot slipped on the slimy fat
Of Mother Earth, and I recall
Some words of his, although not all,
"The rotten stuff!"

He little thought that clay met clay,
As he went sliding on his way.
I was beneath his dignity,
And got his old malignity.
I was the stuff.

Nor reck'd he that I bore the tree,
Whose branch proclaimed my victory
O'er boundless waters of the flood;
Invited his assorted brood
To get the stuff.

His children's children, all, my cup
Have snatched and drained with bottom up;
And as they drank, unheeding they
That maybe I was their own clay.
Their very stuff.

How then can man, whose end is mud,
Sit up and boast of his blue blood?
When all the ichor in his veins
Is but the liquor, with my brains.
To make the stuff.

I know not why, who bends the bow,
Or he who plodding wields the hoe,
Or he who rules with kingly power
Should fill with brags his every hour,
That he's the stuff.

Why, I'm the feet of every man
Who treads on me, and e'en the ban
Of all his other mortal parts,
Save what eludes death's fatal darts,
Immortal stuff!

Aye, there's the rub. I shape the bowl
With man's remains, but of his soul
I know not, save it gives me mould.
I hold but dross, while it is gold
And priceless stuff.

And still, I am the envelope
Of loving man and misanthrope.
I hold them both within my thrall;
It seems to them that I am all,
The only stuff.

One thing I know, while round is round
In this my own terrestrial bound,
That all of earth's own facts are mine,
And all the myriad suns will shine,
Shine on my stuff.

The Lichtenstein Hotel of Reinforced Concrete, now under construction on Market Street, San Francisco
Chas. J. Rousseau, Architect

Cement and Concrete

Development of the Cement Brick Industry

By C. J. HELM

CONCRETE, the greatest of all building commodities, has in its rapid development naturally swung into twofold complexity. Placing this material while in its plastic state in the position of permanency after which curing takes place, forms one division. Therein are included the various forms of monolithic construction. Forming or manufacturing concrete and placing it in position after it has been cured comprises the second division. In this class belong cement blocks, caps, sills, much of the ornamental work and cement brick.

The manufacture of cement brick is now receiving such marked attention and consideration that it merits a review in these columns of the development of this industry.

The increase of this field cannot be termed anything less than remarkable, growing up unassumingly under cover of the development of the general cement field and without particular attention having been paid to it to any great extent by the press, excepting as it has been brought to attention from time to time by manufacturers of brick machinery.

This development must be considered the more remarkable from the fact that a brick is a brick the world over and the adoption of cement brick in the place of the clay article has been the result of educating the people to the intrinsic value of the former and its advantages over the latter, while with the cement block, for instance, its introduction into foundations and such work in the place of natural field stone gave this form of concrete a claim on popular demand without meeting the opposition raised by such an aggregation as the clay brick manufacturers, though they are now thoroughly aroused to the inroads being made into their field by the combined branches of concrete work.

Notwithstanding that all conditions under which this industry was developed were not exactly favorable, it has reached a point where it is recognized as one of the best branches of concrete work, and is so well established that its future success is assured.

This industry is of such importance that the originators in the line are no longer alone in their field of endeavor. It is to be noted that nearly all the manufacturers of cement block machinery have added the brick machine line. Such a condition has been brought about by the fact that a large percentage of the sales of brick machines are made to operators of concrete plants already running block machines. This field has developed to that extent that the operator of the block plant or the man in kindred lines sees the necessity of completing the plant by adding the brick machine.

The fact that the use of cement brick in no way violates the architectural laws founded on brick form of construction, but allows the advantages of concrete, without antagonizing labor, has been the prime factor in insuring success in this line. The architect will not be bound by the limitations of the block plant and the advent of cement brick, used in connection with blocks, has done much to serve the purpose of the architect and place this form of construction in higher favor.

The fact that various grades of brick of a superior quality are produced has made this proposition especially attractive. The builder or contractor is enabled to go to such a plant and place his specifications, the product being made to order to meet his desires if it is not already in stock, and the matters of freight and expensive delays are overcome. Various colors are produced and some very beautiful effects in shades and tints can be produced, but the feature of producing deep colors without increasing the cost of product too much can scarcely be said to have been satisfactorily worked out, though this holds true with any form of concrete. Were it possible to retain the shades of colored concrete when just tempered in the mixing process, the problem would be solved.

The development of the cement brick field so far as the brick maker is concerned, has been accomplished by operators of small plants rather than by the activities of large capital. This is a healthy condition, of importance to concrete operators of limited capital, and to the purchaser of the products as well, because it stands as an industry beyond the influence of combines.

Some of the merits of the cement brick are now well known and the erection of a cement building in a locality serves to bring out very favorable comments and to develop a profitable trade. This of course depends always on the quality of product that is made. As in any other concrete work, care must be exercised in producing good brick and curing them well before using. That they are superior to the ordinary run of clay brick, there is no question. the testimony of brick-layers is to the effect that the cement brick lay faster than clay. In many instances they are sold in competition with cheap clay brick, but being superior in quality they ordinarily bring a better price, in fact, at a higher price they prove cheaper in cost laid in the wall, with lasting qualities, which are also to be considered. The production of high grade facing-brick brings the best profit, but the quantity of this product used is much more limited than a good quality of common brick, on which the operator ordinarily bases his calculations.

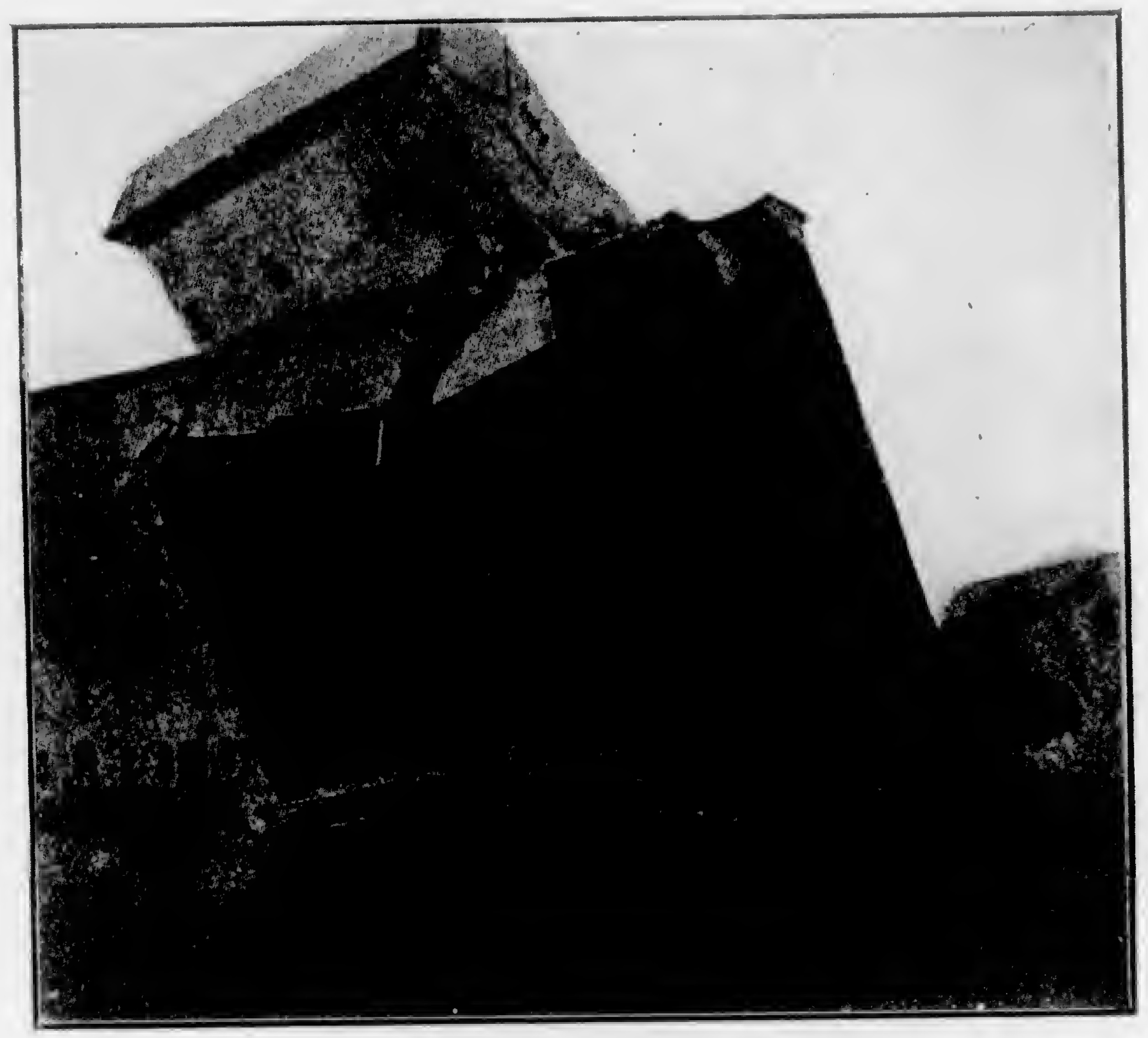
The machinery for cement brick now on the market follows two different systems, one the tamping system, similar to that used in blocks generally, and the other that of pressing with a uniform mechanical pressure.

There is no cause for doubt that the industry will make as rapid strides forward in the future as it has in the past. Its success, of course, is limited by the success of each plant that enters the field and this is dependent always on the production of good concrete.—Concrete.

* * *

Go to Work

"Lives of great men all remind us
We can make our lives sublime,"
If we'd only work instead of
Idly loafing half the time.
—*Boston Globe.*



A Steel and Concrete Elevator Falling into the River

A Curious Accident to a Grain Elevator

ONE of the most peculiar accidents which might befall a modern grain-handling plant occured at Fort William, Ont., recently when the gigantic elevator of the Ogilvie Milling Company slid from its foundation into the Kaministikwia River in much the same manner as a vessel leaves her ways on being launched.

The structure, which cost $250,000, was of the tubular steel type, 60 feet wide, about 100 feet long, and 180 feet high, built on a concrete foundation, which was supported by 65-foot piling driven through clay to solid rock. The elevator had a storage capacity of 500,000 bushels, and contained about 400,000. It was built but two years ago, and was one of the most modern grain-handling plants on the continent, it being electrically operated throughout, induction motors supplying the motive power, says the Scientific American.

It is generally believed that defective concrete work was the cause of the accident. The cement foundation was 16 feet high and only 16 inches in thickness, which it is now claimed was not sufficient to withstand the enormous weight. The foundation gave away at one corner, and the whole wall immediately went to pieces, letting the building slide 30 feet into the river. The structure at the time the accompanying picture was taken stood in 20 feet of water at an angle of 25 degrees. It was a total loss, as the tanks were twisted and pulled completely out of shape. Holes were tapped in the sides of the tanks, and the wheat run off through these openings into scows in the river below, from which it was transferred to boats, about 50 per cent of the grain being lost.

Progress in Design of Reinforced Concrete

IN its latest bulletin, the Association of American Portland Cement Manufacturers publishes a paper by Ross F. Tucker, a civil engineer, who sketches the progress and logical design of reinforced concrete. Basing his conclusions on the increased output of Portland cement in this country, Mr. Tucker finds that reinforced concrete has made tremendous strides in popularity.

Mr. Tucker hits one of the difficulties on the head in his observation on the attitude of the architect toward reinforced concrete construction. "It is the general practice," he says, "to design in brick, stone and steel, and then to call upon a reinforced concrete engineer to reproduce a structure in reinforced concrete. This is an imperfect and unscientific method and unfair to the development of the true value of the concrete structure." It is also pointed out that the cost of cement and of labor involved in the handling of concrete are not the real factors in determining cost, which depends almost entirely on the cost of wood work and centering required. Elaboration of form means of necessity increased cost, and this is one of the things that the average architect has still to learn. Simplicity in detail and the proper use of repetition make for economy.

It is possible to beautify the plainest building by an intelligent arrangement of proportions and modern practice enables the designer to introduce tiles or mosaic work into concrete buildings, with resulting effects of a pleasant character. Simplicity is by no means ugliness, though some designers seem to think that it must be. Mr. Tucker believes that under proper handling a truly American school of architecture may be evolved in reinforced concrete, and we are inclined to be of his opinion. As he says, "The future is replete with possibilities. We have learned thoroughly how to make concrete strong; let us learn how to make concrete beautiful."

* * *

Painting Cement

THE following method of painting a cement wall was described at a recent convention of master painters. The building had become discolored in places and the joints were of a different color from the surface of the blocks. Two parts of Portland cement were mixed with one part of marble dust and mixed with water to the consistency of thin paint or a thick whitewash. The wall must be well wetted before the application of this paint and kept constantly wet while the material is applied, and then must be kept wet for a day longer, in order to make the cement wash adhere to the cement surface. The wash was applied with ordinary whitewash or calcimine brushes, and a man was kept busy playing a hose on it while the work was being done. The whole secret of success lay in keeping the wall constantly wet. A price could not well be quoted on such work, but on a scaffolding job, it should be worth not less than a dollar a yard.

A well-known painter, who is one of the largest contractors in the country, in commenting on this, said that he had frequently been called upon to paint the cement panels in half-timbered houses, and the best material he could find for the purpose was an English material known as Duresco. This comes in paste form and is thinned with water to the consistency of thin cream and to this a little of a so-called "petrifying liquid" made by the manufacturers is added. This material is the same color when it is wet as when it is dry—differing from ordinary water paints in this respect. It can also be used on pressed brick fronts.—Carpenter and Builder.

Heating, Lighting and Electrical Work

Fire Protection for Buildings

By GEORGE J. WELLINGTON

THE fundamental principle of fire protection is the elimination of causes of fires; second, the reduction to a minimum of combustible materials; third, confining of fires as much as possible to points of origin; and last, the providing of means for ready extinguishment. All of the features mentioned receive substantial recognition from Underwriters' Boards and Associations, and should receive from owners as much, if not more, attention than anything else in the construction of buildings.

Earthquakes are due to natural causes, their occurrences are uncertain and cannot be prevented, while fires are a common enemy and may in every instance be provided against.

A Fire Protective Engineer's first consideration should be the proposed occupancy of, and the exposures to a building. His work should commence with the principles in the order as mentioned in the beginning of this article, and should accompany that of the architect and structural engineer from the first lines drawn upon plans.

It is acknowledged that a man with a bucket of water or chemical solution at the start of a fire—provided he has knowledge of the proper method of handling it—is the best fire protection known; but as yet, no one is capable of determining at which point a blaze will occur. The employment of many men with filled buckets is impracticable; thus, the Automatic Sprinkler presents its value to both owner and underwriter. Rates of insurance upon Class C buildings thus equipped are lower than those upon Class A structures not protected. Metal clad woodwork is but a poor apology for fire proofing when properly constructed and containing ordinary glass. Sprinklers are not intended to check conflagrations, but to extinguish or control fires in their incipiency; therefore, due consideration should be given their opportunity for advantageous operation.

With each system an alarm device, which operates a mechanical gong, with slight delay upon the opening of one or more heads, is installed. The electric alarm is uncertain of operation and should be installed only as an auxiliary to that set in motion by a water motor.

The alarm system of the Pacific Hardware & Steel Co.'s building, San Francisco, is the most complete upon the Coast. It not only sets the mechanical gongs in operation, but indicates upon drop annunciators the section of building, the story and portion of floor where the head is discharging.

Proper consideration at the time of preparing building plans permits of valuable economies in costs of installation of Private Fire Protection. Portions of savings thus effected may be devoted to better quality, which, in any event, cannot be overdone, not being essential to conduct of trade or manufacture. Fire protection is the most neglected of all adjuncts to a building; therefore, the necessity of its being as nearly self-sustaining as possible, and fire proof.

Each class of hazard requires different treatment, and no general rule can be applied. Fees for this, as well as other classes of engineering, should be based upon gray matter and not upon quantities of materials used.

Inside stand-pipes with hose constantly attached, and approved chemical extinguishers are of great value in augmenting protection afforded by Automatic Sprinklers.

Ridge, cornice and window sprinklers are efficient in lessening the hazard of exposure fires. It can be stated with confidence that wire-glass in properly constructed metal frames augmented by window sprinklers, with proper water supplies, is equal, if not better than any shutter manufactured. The latter soon deteriorate from weather and lack of attention, and are rarely closed when needed.

Contents of roof tanks of gravity flow, except as secondary supplies, to sprinkler systems, are practically useless for fire purposes when discharged at less than fifty feet below the bottoms.

Basement reservoirs with flexible and non-deteriorating linings or flowing wells both of sufficient capacity and furnishing suction for steam or gasoline driven pumps, are the solution of perfect private water supplies in sections susceptible of seismic disturbances. This point is borne out by the operation of pumping plants at the Palace Hotel, Merchants' Exchange, and Western Electric Company after the earthquake of April 18th. The building of the Western Electric Company was saved from destruction more through the private water supply than from its wire-glass windows. Electrically driven pumps are impracticable on account of uncertainty in their supply of current.

* * *

Colossal Old Ruins

The oldest architectural ruins in the world are believed to be the rock temples at Ipsampool, on the Nile in Nubia. One of the ancient temples consists of fourteen apartments hewn out of solid stone. The largest single stone used in this work is one which forms a veranda-like projection along one side of the main temple. It is 57 feet long, 52 broad and 17—one acre of massive square pillars, four in each row and each 30 feet high. To each of these pillars is attached a colossal figure of a human being, reaching from floor to roof. In front of the main temple are seated still other colossi, four in number, the two largest being 65 feet high. The ruins are supposed to be four thousand years old.

* * *

The Omnipresent Cow

When the historic cow kicked over the barn-lantern that started the destruction of Chicago, she achieved an immediate place in the hall of fame. Chicago rose from her ruins, as San Francisco will do, bigger, better and more enthusiastic than before. Another cow has made a bid for undying reputation. The story comes from Harlem, Chicago, where cows are rarer than goats and less sure-footed. The cow fell through a wooden sidewalk and broke a leg. Subsequently several people, following a vicious example, did the same thing, and now Harlem will spend $135,000 for new cement walks. The enthusiastic denizens are now talking of a monument to the cow—something along the lines of the Roman wolf.—Concrete.

The Proper Kind of Heating Apparatus

By T. M. CLARK

DURING the early fall of each year architects frequently hear from friends and clients, "What is the best furnace?" or, perhaps, "What shall I put in, to heat my house?" The injudicious architect is apt to reply to this question with a promptness which he sometimes has occasion to repent of afterwards for few things are more difficult than to adapt satisfactorily a heating-apparatus to the requirements, or, possibly, the whims, of the people who are to use it. One person has a very large house to warm; another has a small one; a third has a passion for fresh air, and is not happy unless he feels a breeze constantly blowing upon him; while a fourth lives in deadly fear of draughts. A fifth cannot breath in an atmosphere which is not kept constantly moist; while a sixth takes cold in such an atmosphere; and, of the seventh and eighth, one requires an average temperature of eighty degrees in his house in winter, while the other is uncomfortably warm with the thermometer at sixty. Of course, none of these people mention their abnormal tastes, and it is left to the architect to divine what they really want, and to supply it, according to his judgment and experience, without offending them by appearing to notice their eccentricities.

In general, tall, thin and old people like to be warm. Their circulation is poor, and their feet and hands, in consequence, disposed to be cold. Moreover, as their respiration is apt to be superficial, in correspondence with the sluggish action of the heart, they are, as a rule, less sensitive to impure air than persons of more vigorous constitution. Such people, therefore, usually, although not always, prefer a powerful heater, such as a wrought-iron furnace, or direct steam radiation, either of which affords them an opportunity for warming their feet and hands, at the same time that they breath a hot, stimulating atmosphere.

Where people of this temperament are happy, those of a more vigorous constitution are wretched. Such persons, coming, in winter, from a brisk, healthful walk into a room suited to an old or anaemic subject, break out into a perspiration which is not only annoying, but dangerous; their heads throb with the stimulus imparted by the heat to the circulation, and they gasp for the oxygen to which their lungs are accustomed.

Children, again, require special treatment. Being active, and having rapid circulation and sensitive lungs, they need plenty of fresh air, at a temperature not too high; but they have little power of resistance to cold, and a chilly atmosphere, in rooms for their use, must be avoided. It is to be remembered, also, in arranging for children's day-rooms, that the little people live in the stratum of air next the floor, which is always at a lower temperature than that in which their elders move, and is often so much cooler than the air above it that young children, playing on the floor, may be seen with their hands and faces blue with the cold, while the grown people about them are perfectly comfortable.

For children's rooms, the sovereign remedy for this state of affairs, which in conjunction with the cruel fashion of dressing babies so as to show their little bare legs and arms, has brought desolation to many a household, is to provide an open fire. A simple fire on andirons, in a brick or soapstone fireplace, is a rather inefficient heater for our climate, so that warm air should, in addition, be brought into the room from a register, or around the fireplace itself; or a jacketed open stove, with air-supply from outside, may be substituted for the fireplace. By any of these devices not only is the atmosphere of the room kept pure, and at a comfortable temperature, but the floor in front of the fireplace or open stove is warmed by direct radiation from the blazing fuel, so that it imparts warmth to the little limbs, instead of chilling them, at the same time that the temperature of the general atmosphere of the room may be kept low enough to avoid debilitating the children. Of course, little children must be kept from falling into the fire, or trying experiments with it, by an efficient guard. This will generally have to be made to order, as nothing suitable is kept in stock, and should be three feet high, of heavy wire netting, in an iron frame, forming three sides of a square, about three feet on each side. Such a screen will be heavy enough not to be easily tipped over, and will keep the children at a sufficient distance from the fire, while it can be bronzed or painted, so as to be inoffensive in appearance.

Grown people, especially invalids, would often find advantage in the cheerful radiation and the rapid change of air, afforded by an open fire; but an open fire involves labor and expense, and is not usually sufficient for comfort in the American winter climate, so that some form of what the Germans call "central heating" is practically indispensable for our houses; and, as the central apparatus is generally presumed to have a capacity enough for warming the house without aid from open fires, the latter have come to be looked upon as luxurious, to be only sparingly indulged in.

A generation ago, the most common device for central heating in American houses was the "hall stove," a large sheetiron stove, set up in the staircase hall, often with its smokepipe carried up through the well of the staircase, as additional heating surface, nearly to the top of the house. Although the sight of one of these stoves, with its red-hot funnel carried up twenty or thirty feet through the narrow well room of a pine staircase, was calculated to give an insurance man bad dreams for a week afterward, they were useful in furnishing a supply of warm air in the middle of the house, which could be admitted to the rooms by opening the doors; and they were simple, cheap, and easily kept in order. The successor of the hall stove was the brick-set furnace, many examples of which are still doing duty, after twenty years or more of useful existence. Although much more expensive than the hall stove, the brick-set furnace, placed in the cellar, had the advantage of being out of the way, while the tin pipes leading from it supplied the various rooms with warm air directly, and more satisfactorily than was possible where it was necessary to keep the doors open to let in warm air from the hall.

As usually built, the brick-set furniture consisted of an inclosure of brick walls, five or six feet square, covered with brickwork, laid on iron bars, which rested on the walls. The walls were usually made double, with an air-space four-inches wide to prevent loss of heat. The tin hot-air pipes were built through the brick covering, and the air was heated by a complication of corrugated or spiked surfaces and convoluted smoke-pipes inside. The earlier furnaces of this sort were made with heavy castings, and were very well designed for utilizing as much of the heat of the fuel as possible. Their capacity was however, notwithstanding their bulk, comparatively small, and they were intended to be operated at a high temperature. With the wood-burning patterns, which were often used, the air delivered from the registers was frequently hot enough to set fire to a match, and a comparatively small proportion of air at this temperature was sufficient, mixed with the other air of a room, to bring the whole to the desired average. Very commonly, the air to supply the registers was taken directly from the cellar; but people who had whims on the subject of ventilation, sometimes insisted on having "air-drains" provided, by which a limited amount of fresh air was brought from the back yard, under the cellar floor, to the air-chamber of the furnace.

By degrees, architects and householders became dissatisfied with this form of heating-apparatus. The intense fire which it was necessary to keep up in such furnaces heated the cellar, notwithstanding the double walls of the setting; the mass of brickwork was accused of "absorbing" a quantity of heat which did not belong to it, but ought to be transmitted to the rooms above; and people began to find that their registers delivered to them "burnt smells," "carbonized dust," "scorched air," "carbonic oxide," and many other unpleasant things, in place of the "June atmosphere" which the furnace advertisements had led them to expect.

The first attempts at correcting the imperfections of the furnace air took the form of supplying it with moisture. Not only were water-pans inserted in the air-chamber of the furnace and kept sedulously filled with water, but dish-pans and tin wash-basins were to be seen standing on the registers in houses which aspired to the reputation of being the home of advanced intelligence, and huge sponges or towels soaked with water were often hung in the room to increase the evaporating surface. The care of all this apparatus was, however, a serious burden to the housekeeper, and the virulence of the air-moistening fever soon disappeared. Meanwhile the designers of furnaces, recognizing the advantages of increasing the supply of air and reducing the temperature proportionately, had modified their patterns, and, little by little, the modern type of hot-air furnace was evolved.

As now made, furnaces for central heating in dwelling-houses combine, in a greater or less degree, the best features of the various types which have preceded them. In the old brick-set furnaces, which contained a complication of heating surfaces, flues, pipes and domes, it was often found that a part of the pipes was useless, the smoke and heated gases taking a short cut through the nearest, and leaving the others cold. To prevent this the flues were, in certain cases, constricted, so as to force the smoke to divide itself among them; but this device had some practical inconveniences and was not always effective. At the same time that manufacturers were beginning to find defects in the multiplied radiating members of the old furnaces, a sudden outcry was raised against the use of cast-iron for heating, on the ground that carbonic oxide passed freely through its "pores" and affected the health of persons breathing air warmed by it. Although this notion was afterward completely disproved, it seized upon the popular imagination, and a demand arose for wrought-iron furnaces with riveted joints, which would be impervious to noxious gases.

The first furnaces put upon the market in response to this demand consisted simply of a cast-iron fire-pot, lined with fire-brick, upon the top of which was set an inverted tub of boiler iron, with riveted joints, having a smoke-pipe issuing from it, the whole being enclosed in a casing of galvanized iron. Air was brought in between the fire-pot, with its boiler-iron "dome," and the galvanized-iron casing, and escaped, after warming itself by contact with the hot surfaces, through tin pipes carried from the top of the casing to the various rooms. Nothing could be simpler, and under suitable conditions this form was, and still is, very effective. It is, however, applicable, in its simplest form, only to small houses, or, at least, to houses which, like summer cottages, are provided with only a small number of registers. The quantity of air which can pass up between the casing and the dome of a furnace of this sort and becoming warmed by actual contact with the hot surfaces is very limited, and to try to distribute it among a large number of registers results only in disappointment, where the same furnace would supply a small number of registers with satisfaction to everybody concerned.

Although these very simple wrought-iron furnaces will supply two or three rooms with warm air with remarkable certainty and effectiveness and are less affected than those with more extended radiating-surface by sudden changes of wind, the comparative smallness of their capacity has led to modifications in them, for the sake of increasing the amount of air which can be warmed by passing through them, and thus enabling them to supply a larger number of rooms. In a good and inexpensive modern furnace this end is attained by giving the wrought-iron dome the form of a short telescope, the casing remaining cylindrical. With this arrangement a larger quantity of air can be admitted under the casing, as that which fails to come into actual contact with the surface of the dome or the casing accumulates in the space around the upper segment of the dome, and either comes in contact there with the upper surfaces of the dome, or has time to mix with the hotter air which has been in such contact before issuing from the registers.

This modification, although it increases very sensibly the heating capacity of the furnace, without interfering with its good qualities, does not confer upon it the ability to supply hot air for a large house, and, for this purpose, the heating-surfaces must be again increased, so that more air can be brought in, with the certainty that none can escape through the tin pipes above without coming in actual contact with hot iron. After many experiments, furnace manufacturers have very generally adopted as the best type of furnace of moderate cost, for houses of comparatively limited size, a type in which a large fire-pot, roughly hemispherical in shape, is surmounted by a dome, and this again by a ring-shaped flue, through which the smoke and hot gases from the dome are conducted, and from which they escape to the chimney. In a furnace of this sort the air admitted between the fire-pot and the galvanized-iron casing, now generally substituted for the brick casing of the past generation, passes upward, warming itself by contact with the walls of the fire-pot and dome, and the inner surface of the casing, until it comes into collision with the annular flue, which extends out over the space in which the air has been traveling, almost to the casing. The interposition of this hot obstacle in the path of the air practically insures the collision with it, and consequent warming of whatever air may have escaped contact with the heated surfaces below; but, to make assurance still more sure, the air is then led, before it can reach the tin heating-pipes, laterally along the underside of the hot annular flue, to openings in the middle, through which it rises freely to the outlets provided for it. By this means a large amount of air is warmed with rapidity and certainty and is delivered very freely into the heating-pipes.

Although different makers adopt variations in this general type, some making the annular flue deep and some shallow, some constructing it of cast-iron and some of wrought-iron, some corrugating the dome and fire-pot to increase their heating-surface, and some leaving one or both of them smooth, the principle is the same in all, and the ease with which the annular flue is cleaned out, the evenness of distribution of the hot gases through it, and the certainty with which it intercepts and warms the air without too much checking its flow, make it, perhaps, the most valuable improvement ever introduced into furnaces for houses of moderate dimensions.

For very large houses, however, even greater air-warming capacity is required, and a furnace which would heat in a perfectly satisfactory manner eight or nine rooms may, if called upon to supply warm air to fifteen, fail to keep any of them comfortable, for the reason that the additional heating-pipes draw from the furnace a certain amount of warm air, which is chilled in its feeble progress through them and fails to produce any satisfactory effect in the rooms which they supply, at the same time that the subtraction of this warm air from the supply of the other rooms prevents them from being warmed. It is therefore essential, where a large house is to be heated, to provide for the introduction of an adequate supply of air. All this air must be warmed by actual contact with a heated surface before it enters the room, and for this purpose the furnace must present a large amount of heating-surface. It is useless to give a wide space between an ordinary furnace and the casing so that a large amount of air can pass, trusting to keeping up a hot fire to warm it all, the result of this being simply to supply hot air to the registers most favorably situated and cold air to the others.

For large furnaces, therefore, a certan complication of heating parts is necessary, in order to extend them sufficiently to intercept and heat a large volume of air. In several excellent furnaces large pipes or flues, either straight or curved, are provided, passing through the fire-dome and opening at top and bottom into the air-chamber. The air from the lower part of the air-chamber passes up through these flues and issues from the top, heated by its journey through and over the fire, and joins in the upper part of the air-chamber the portion which has ascended between the furnace and the casing. The capacity of the furnace for transmitting air is immensely increased in this way, and the portion which passes, by means of the air-flues, through the fire itself is quite as effectually warmed as that which passes through the narrow space between the fire-dome and the casing.

A variation of this type is made by building up the fire-pot and dome of cast sections, which inclose between them, when put together, vertical air-flues, opening at the top and bottom into the air-chamber, as in the case just described, and serving in the same way to add to the volume of air passing up outside the fire-dome a large additional quantity, passing through the fire-dome, in close contact with the fire. As the upward current through these strongly-heated flues is very rapid, the sides of them are formed with horizontal waves, or corrugations, so that the air will not only be held longer in contact with the hot iron, but will be thrown with a certain force against it, this being found to favor the heating effect.

A pattern of furnace somewhat similar in appearance to those with air-flues running through the fire-pot has a number of vertical smoke-flues carried down through the air-chamber, the smoke being drawn out from them either through an annular flue at the bottom, communicating with the smoke-pipe, or through a similar annular flue at the top. If such furnaces are well managed, and if the conditions are favorable, they are powerful heaters; but if the chimney draught is poor or the fire burns sluggishly or unevenly, the smoke and hot gases may find their way out through one or two of the flues, leaving the others cold, so that only the tin pipes from the side of the furnace over the active flues will supply warm air to their registers, the registers supplied from the other side of the furnace being cold.—The American Architect.

* * *

Cement shingles are fast coming into popular demand, as their advantages become more widely known. In their most modern and best form they are only a trifle heavier than slate, and in cost they amount to little more than the best wood shingles, while they are of course much longer lived. A large variety of designs for different purposes is manufactured and most of them are reinforced with a metal skeleton, which provides means for securing them to the roof. Cement shingles are practically everlasting, since the only effect of water upon them, when properly made, is to increase their hardness and density.

Interior Decoration

One of the New Friezes

New Styles in Wall Paper

IT is possible to reproduce for a nominal sum the wall coverings and decorations of the earlier days, which Americans of large fortune duplicate at a cost of many thousands of dollars.

It is no unusual thing, for instance, for twenty thousand dollars to be spent by New Yorkers in decorating the walls of a drawing-room, says an exchange. On the other hand it is possible by the aid of the latest wall papers to get a very pleasing imitation of a twenty-thousand dollar effect for sixty or seventy dollars. Carved wood, gold leaf appliques, painted canvases, are all suggested in the latest wall papers, the more artistic of which are designed to bring to the front panel effects. Never before have panel effects been so popular, not only in drawing-rooms, but in dining-rooms and in bedrooms, and it rests with the housekeeper whether she will have an ordinary plain papered wall or a wall broken up by oblongs of contrasting paper into a very pleasing copy of a French or Italian salon of the seventeenth or eighteenth century.

"There are hundreds of women of small means who have not the smallest conception of the possibilities in wall paper," said a New York dealer.

"What the New York woman of average means or of small means sadly lacks is a disposition to study period effects in relation to house furnishing and decorating."

In describing panel effects of inexpensive grades and their cost, the decorator gave as a rough estimate from one to two dollars a roll as about the minimum cost. This means the use of fifty cent and one dollar a roll paper. The cost of paneling a room is just about double that of the paper on account of the waste and extra work.

For a wall to be covered between a ten-inch baseboard and a molding near the ceiling with a long paneled effect, the least expensive method is to cover the room first with a solid-toned moire paper at forty cents a roll and then merely outline panels with a six-inch wide border representing a floral or conventional design, the corners of the panels being elaborated to give variety to the stiffness of pattern.

The widest of the panels, in one outlined design of pale gray moire paper bordered with pink roses and green leaves, was about twenty-five inches and the narrowest panels between doors and windows about fifteen inches. All the panels stopped within six inches of the molding and the same distance from the baseboard, and were about eight inches apart in the wider spaces of the room.

A pale green wall with panels outlined with darker green and gold; a yellow wall outlined with brown, green, and gold; and old rose outlined with white and gold, were among the combinations.

Next to this method the least expensive way of having a paneled room is to use fabric paper for the panels; that is, paper of small, rich patterns, either figured or striped—preferably striped—cut out in fancy designs at the corners. As in the case of outlined panels, the room is first covered with plain paper and the panels afterward applied.

An illustration of this sort of panel was furnished by a Louis XV fabric paper of roses and bow knots on a plain cream color foundation. A more dignified design had panels in arabesque and scroll pattern of copper color, gold and green on a dull green foundation.

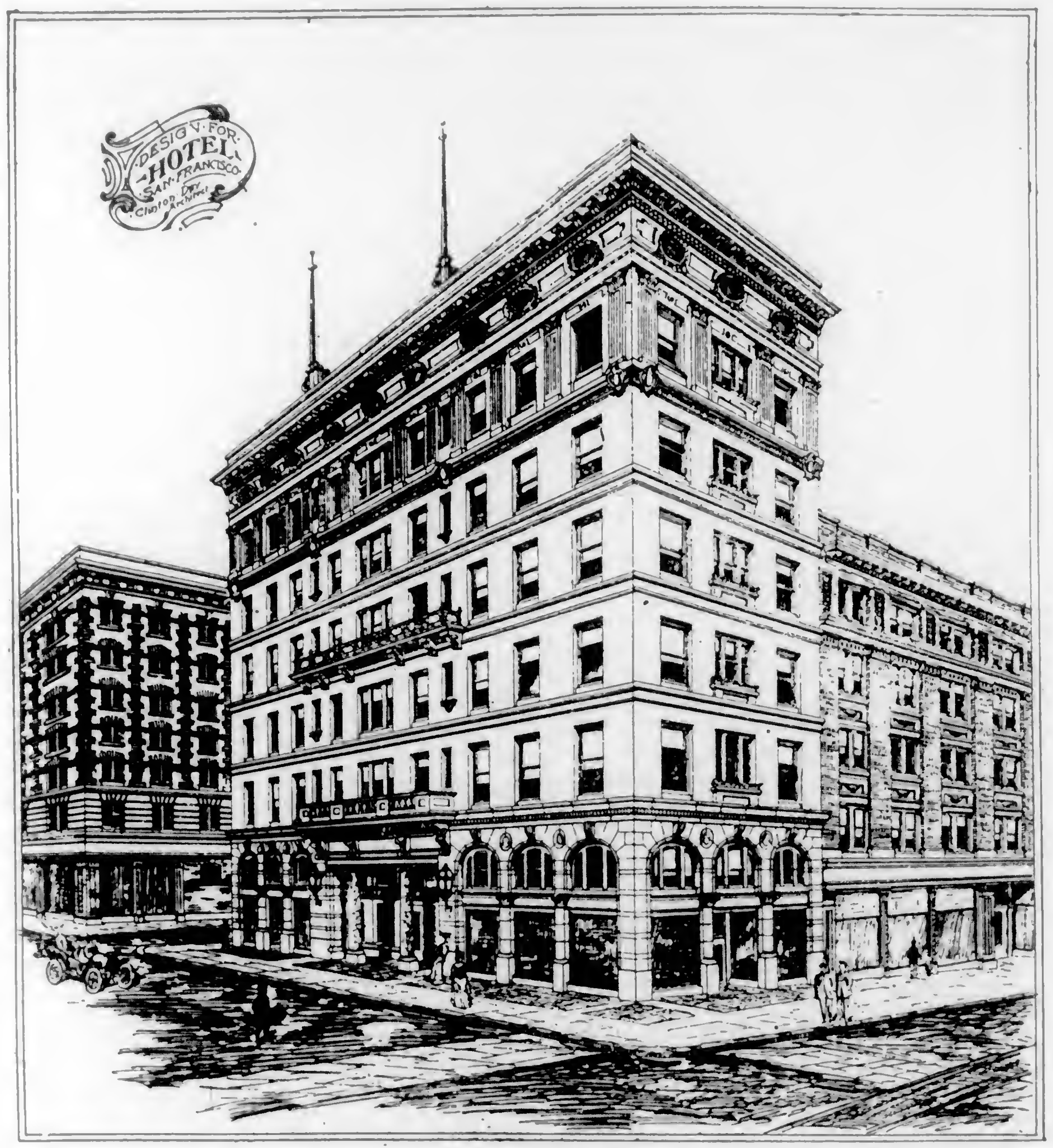
The panel designs this season are by no means confined to long effects, many of them showing short, almost square panels arranged above a paper wainscoting, if it may be called so, about twenty inches wide above the baseboard made of the same paper as the panels. Occasionally this wainscoting is one yard or more deep. This idea is particularly appropriate to dining-rooms, with rich wall papers taking the place of the lighter colors preferred in parlors and bedrooms.

Among the most attractive of the newer nursery effects is a double frieze from thirty to forty inches wide, the lower edge of which is finished with a shallow shelf of enameled wood. The lower half of the frieze near the shelf is of plain paper, the upper half shows fancy picture designs of animals, sporting scenes, and clowns, or nature studies of trees, mountains, and rivers. A small patterned paper is generally used to cover the wall below the frieze, and the shelf is used for pictures.

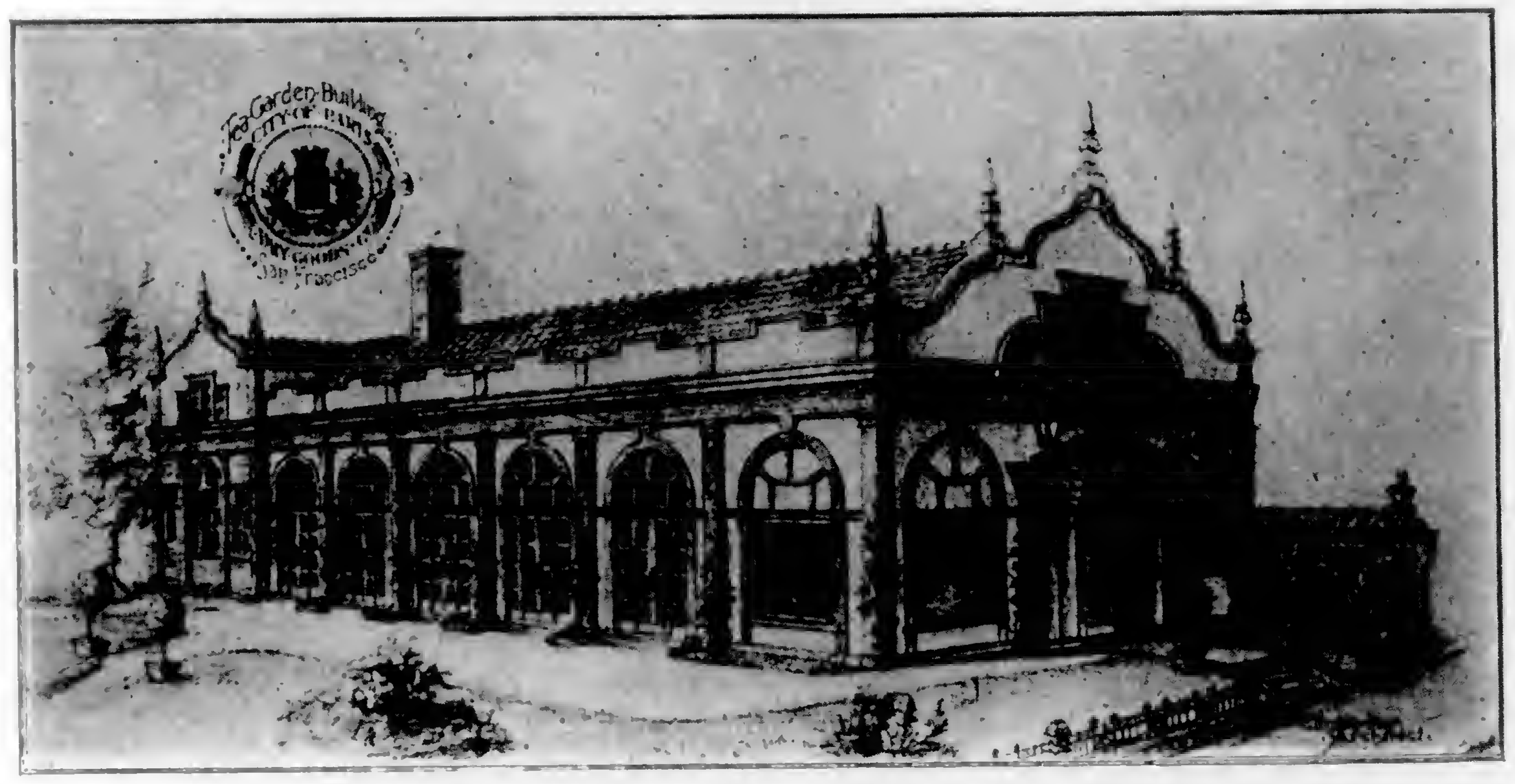
For sleeping-rooms there is a new fashioned bouquet pattern, hand-polished paper which is one of the most beautiful seen in some time. The most attractive designs have a white background sprayed with clusters of roses, lilacs, carnations, in large bouquet effects. This paper sells for six dollars a roll.

A rival paper in style and price shows no background, the pattern being a compact mingling of foliage and birds of natural color. Although used to cover an entire wall, the most effective arrangement of this paper is in the form of a thirty-eight inch deep frieze drooping over a plain wall. The frieze is not divided from the plain paper with a molding, and its lower edge instead of being straight is irregular, following the line of flowers and foliage.

A new paper which sells for one dollar a roll and is particularly appropriate for halls, libraries and dining-rooms, is called silk fibre and is heavier and two inches wider than the average paper. It is of solid colors only, and yet it cannot be called perfectly plain, like cartridge paper, for example, because of a mottled effect which gives a sort of shimmer to the surface. The golden browns, rich deep reds, and foliage greens are particularly desirable.



Design for a Hotel
Clinton Day, Architect



Tea Garden Building for the City of Paris, San Francisco
Clinton Day, Architect

The Brother of the Cross—A Story

By BURTON RICHARDS, in The Craftsman

ABOVE the town a huge stone cross was set on the hillside. The highroad ran just below, and a little path led from it straight to the foot of the cross. A tiny stream sprang from a rock near by. Many a weary traveler turned from the dusty road to drink of the cool water and to rest in the shadow of the cross. Here one day came a young sculptor. He lay down to rest at the foot of the cross, and as he dreamed he had a beautiful vision, fairer to him it seemed than the heart of man had ever conceived. "I will tell my dream in marble," he said: "here on the hillside by the cross I will place it, that the hearts of men may be touched by its beauty."

He had received from a great sculptor a gift of a flawless piece of stone. Before this block he stood one morning, chisel in hand, ready to begin work in the very shelter of the cross. He had scarce struck the first blow when a man called to him from the road below: "I pray thee, good sir, come down to help. My beast is heavy laden and has fallen on the road." The sculptor had laid down his chisel and turned toward the path, but in that moment he saw the vision more clearly than yet before. Never doubting, he grasped his chisel, and called to the man: "I work a great work, I cannot delay." Day after day with zeal he wrought, each line a new revelation. Through the long nights he lay beside his marble under the stars, and dreamed again the dream. Many wayfarers besought him for alms. Rarely he stopped to toss a coin. More often he said, "I work a great work, I cannot delay," and so the marble grew under his hand.

One day an old woman approached by the path and would have lain down to rest in the shelter of the cross. Her trembling limbs would hardly bear her up the steep ascent. "I pray you, good son," she called, "for the love of her who bore you, help an old woman up the path." The sculptor turned to look down upon her, but he shook his head and made reply: "I work a great work, I cannot delay." Even as he spoke his chisel slipped and a deep scratch appeared in the marble. Many questioned him of his work, but he made no answer. "I will carve so fair," he said to himself, "that the marble will speak and none shall need to be told." Earnestly he toiled and the vision grew fairer under his hand, yet each day that he refused aid to a brother man, that day some flaw appeared in his work.

On the morning of the day which should fulfill his task, he was interrupted by the approach of an aged priest, who, tired and footsore, slowly climbed the hill and prostrated himself at the foot of the cross. "Son, son," he called feebly, "a drink of thy cool water, in the name of Christ." The sculptor heard him not. He called again, with no answer but the ring of the chisel on the stone. At last he painfully made his way to the stream to drink.

"Son," he said again, "I need thy aid. I have traveled many weary hours. I am spent; yet in that cottage yonder on the hillside is a sick child. A shadow lurks outside. I must be there, but I am weak. Will you give me your strong arm to help?" The sculptor paused but a moment to make answer: "I work a great work, I cannot delay." Long the priest plead, but the sculptor gave no heed. "What is your great work?" at last he sadly asked; and the sculptor pointed to his marble, the form of the woman, stooping in tender pity to raise the sinner, prostrate at her feet, and proudly made reply: "I work the supreme work of love." The priest leaned against the strength of the cross as he solemnly made answer, "Woe unto him that saith to the wood, Awake! To the dumb stone, Arise! it shall teach. Behold it is laid over with gold and silver, and there is no breath at all in the midst of it," and so saying, he went his way.

At evening the sculptor threw down his chisel. "It is done," he exclaimed "With my hand I have wrought supreme love." As he spoke, he stepped back to view his work. He stood by the cross to look upon it. But what was this? He brushed his hand hastily across his eyes. Where was the pity, the tenderness he had dreamed in the face of the woman? What trick was this? The face was the face of stone. No soul was there. Slowly he saw the truth. In despair he hurled his strength against the mocking stone and with a mighty blow cleft it in twain. Through blinding tears he laid his hand among the pieces of his broken Love. All the night long he lay in bitterness of grief, and when the day had come all was gone—hope, the vision, the marble, even the stream and the sky, and in the darkness he could only grope his way to the cross and cling there.

In the morning the people of the town found him and brought him food and comfort; and because he was happier by the cross, they made a shelter for him, and there he lived. Scarce a traveler came to the cross that did not bring him something for his comfort. Never a traveler left the cross that was not cheered by his loving care. The simple folk from all the country brought to him their griefs and joys, sure of finding sympathy for each alike. "Brother of the Cross" they called him.

So the peaceful years passed. One day his hand fell upon his chisel. He called his friends about him and plead that they would bring him a piece of marble. They looked in wondering pity upon him, but they brought him a piece of his shattered Love. "He is old and blind," they said. "He can not know."

Again, day after day he carved, joying in the feel of the marble under his hand, yet often stopping to give the cup of cold water and refreshment to the weary. One day a traveler reached his door and fell exhausted, stricken with mortal agony. Earnestly the sculptor tried to give relief. "But one thing can avail," said the voice of the traveler. "And that can not be. I bear the pain for many." "Then," said the sculptor, "I, too, can bear. I am of no use; I am blind. Let me bear your pain."

The traveler laughed a low, sweet laugh. "That is the one thing," she said. "The joy of your bearing has made me free." "Ah, if I might see your joy!" said the sculptor. "You have seen it already," she said. "You have found it in every soul to which you have brought comfort. I am Love," and she led him to his marble and gently opened his closed eyelids, and lo! the face of the marble and the face of Love were the same.

* * *

To Stain Floors

Here is a good recipe for staining floors and also for staining around the carpet in a bedroom: First get the floor perfectly clean. If there are cracks between boards fill them, then mix linseed oil and burnt umber together, a tablespoonful to a pint of linseed oil. Stir it thoroughly. If you wish it darker, put in more umber; if lighter, use more oil. Put it on the floor with a clean paint brush. Rub it evenly. After a few days, when dry, put on a second coat. Try a little of the stain on a piece of wood first to get the color you wish. When it gets soiled or dirty mop it off with a little warm borax water, which will clean and not hurt the stain. You can retouch it now and then if it needs it. This finish resembles a hardwood floor.

Advantages of Government Interest in Concrete

MEN who are really interested in the forward development of the concrete industry are gratified by the large number of important works recently undertaken by the federal government. Their satisfaction rests upon the knowledge that governmental undertakings are ordinarily of sufficient importance to attract widespread attention. The impersonal character of the work of supervision and construction opens the way to a wide notice at the hands of the daily press—notice that an individual or a private corporation would fail to excite. Descriptions and photographs of public works are generally circulated and knowledge of them, in one form or another, is brought to a very large number of people. This increases public interest in concrete as a construction material, which is something much to be desired.

Again, where the government undertakes important work, the design and specifications are prepared by experts of unquestioned ability and experience. The question of price enters into competition, but the government is anything but niggardly in the sums it expends upon permanent improvements; if anything, it leans too far the other way. Thanks to the comparative newness of concrete work, there has as yet been little chance for the school of graft to be established, and the government works in concrete have been on the whole substantially constructed, at a fair price. Careful specifications and care in seeing that they are carried out to the letter result in completed work that is not only substantial but attractive and the fine appearance of public works in concrete is an object lesson to private enterprises.

Of very recent years a large number of important operations in concrete have been carried on under federal supervision. Enormous irrigation dams in the arid lands of the Middle West, artificial harbors and breakwaters, lighthouses and public buildings of all kinds are being put up every year. A gratifying feature of the government's interest is that the more construction there is done along this line the more there will be. In practically every case, concrete has fully justified itself in its behavior at the hands of government builders.—Concrete.

* * *

For Finishing Walls

A rather novel method of finishing the outer surface of the walls of a reinforced concrete building was recently adopted in connection with a structure in Knoxville, Tenn., says The Record. The sides of the building have curtain walls of concrete brick, while the front and back walls are of monolithic construction. When the work was completed, the front elevation was treated to a cement solution applied by means of whitewash brushes. The solution consisted of water and cement of the consistency of thin grout, which was strained through cloth to remove any coarse particles that might scratch the concrete surface of the building. The coated surface was given a light and quick rubbing with carborundum bricks until a very smooth surface was obtained. The thickness of the solution prevented it from running off the wall and served as a plaster as well as a dressing. The result is a front of one color, which closely resembles limestone.

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Wrecking the Palace Hotel

The Palace Hotel, the sturdy walls of which have stood since the fire as grim reminders of its past splendors, will soon be a memory, as are already the many brilliant fetes which once took place within its glittering ball-rooms. In four months not one vestige of the world-famed hostelry will be left on its site. The work begun a week ago by the E. W. McLellan Company in razing the staunch walls is progressing rapidly, and already the Annie and Jessie street section has been wrecked and carted away.

The Palace Hotel was perhaps the most solidly constructed building in San Francisco. Erected over thirty years ago it stood as a splendid sample of the architecture of the seventies. The bricks were molded together with a mortar composed of lime and cement, with strips of Norway iron and steel cables intercepting. The mortar is so adhering that it is impossible to scale the bricks by machinery, and all this work is being done by hand. Massive girders of iron weighing seven tons each, formed the supports. There were one hundred of these in the building.

While considerable difficulty is being experienced tearing down the walls, when they do come down, they fall in complete strips, the bricks failing to become dislodged even after striking the ground, and it is necessary to then bring into play the pick and chisel. Two mighty hoist engines, of thirty horsepower, equipped with inch and a half cables are used in the work. These engines have a pulling strength of 5,000 men.

A force of three hundred men is now employed in the work, and soon will be working night and day. Two steam shovels will be brought into play for the purpose of conveying the debris to cars and wagons.

There are 120,000 cubic yards of material in the structure. It will take 80,000 wagonloads to remove this. These wagons if placed in a row, would reach from San Francisco to Mt. Shasta and encircle its snow-crowned crest. It is estimated that there are 40,000,000 bricks in the building. These if placed in a row, would extend across the Pacific to the Hawaiian Islands. The hotel was equipped with separate fire places and flues. These would make a wireless pole as high as Niagara Falls. There were 200 tons of fire-escapes, which would make a ladder long enough to cross the Golden Gate.

An extremely novel and unique electrical process is being used in the work of cutting up the wrought-iron girders which formed the supports of the great glass roof of the court. These fell into a disordered, twisted heap to the bottom of the court, and it is impossible to remove them by hoist. The method used is known as the electrical arc process, and is of late invention. By forcing electrical heat of 5000 degrees, generated by a huge dynamo, into the mass of iron, a gash is rapidly melted out and the girder cut into pieces easy to handle. It takes about twenty minutes to cut through a foot girder. The glare from the tip of the needle used is so intense that it cannot be looked at, and the men operating are compelled to use a queer cap with goggles.

Laborers digging below the surface of the sidewalk were compelled to desist the other day because of hidden fires which were uncovered. In many places a combination of wood, plaster and mortar had formed a sort of charcoal, which, secluded from the air by piles of debris, has been smoldering since the fire. The sand seems to pulse and throb with the heat, and in some places water has exuded at a boiling point.

Five Story Building

The George Brown Estate Company has commenced the erection of a substantial permanent building on Larkin street, at the southwest corner of Walnut avenue, with an L extending southward which has a twenty-five-foot frontage on Post street. Architect August Nordin has prepared plans for a five-story and basement structure, and the work of excavation is now in progress. The entire building will be of reinforced concrete and built in the most substantial manner. The exterior walls will have a cement surface, and all the cornices and ornamentation will be of concrete and cement. The entrance to the upper floors will be on the Post-street side, where there will be fast-running elevators, with an elaborate hallway worked in marble and mosaic. The cost of the building will be about $75,000.

Brick Building

A substantial four-story and basement brick building is in course of construction on the northwest corner of Pacific and Sansome streets, covering the site 68:9 by 137:6, for account of I. Levy, to be occupied by the Standard Biscuit Company. The building is designed with a view of adding two more stories if needed to accommodate the requirements of the business. The floors are calculated to bear heavy loads, and are supported entirely on steel columns and girders. The exterior of the building will be faced with red pressed brick, trimmed with sandstone sills and belt courses. Three large freight elevators constitute part of the equipment. The piles for the massive foundation are already in place, and the work is to be rushed to completion. The cost of the building is estimated at $70,000. Sylvain Schnaittacher is the architect.

Big Lodging House

E. Rolkin has applied for a permit from the Board of Public Works to erect a $100,000 three-story brick lodging-house on his lot on the west side of Third street, a short distance north of its intersection with Brannan. The building will have a frontage of 120 feet on Third, with a depth of 160 feet. Sutton & Weeks are the architects, and Cook & Young will build the structure.

New Berkeley Building

The central business section of Berkeley is soon to be graced by a handsome $60,000 three story, reinforced concrete and brick structure.

The building will be erected by B. F. Brooks, the well known capitalist of that city and Eugene Brock of the Ferrier-Brock Realty Company, and plans are now being drawn.

The upper floors will be devoted to large apartments, while the first floor and basement will be for business purposes.

F. W. Foss & Co. have the contract for the excavations, but the structural and masonry work has not been let.

To Use Roman Stone

White Roman stone will be used to face the new Knickerbocker building for which architect John C. Pelton is now making plans. The building will occupy a desirable site at the corner of Second and Natoma streets, San Francisco. It will be six stories and will represent an expenditure of $120,000. The building will have a steel frame and will be a class A structure.

New Oakland Building

Architect Charles W. Dickey of Oakland, is making plans for a three story building for the Pacific States Telephone Company. It will be a sub-station, but will be quite an imposing structure. Brick with elaborate staff and stucco work will be used as an exterior facing. The building will cost $40,000. Mr. Reed is no longer a member of the firm of Dickey & Reed. He is to take a two years course in a technical school.

Bids for Steel Work

Figures are now being taken by Architects Oliver and Foulkes for the steel work of the new twelve-story Class A Scott and Van Arsdale building on Stockton street. There will be many tons of steel required.

New Warehouse.

Officials of the Southern Pacific are making plans for the erection of a new warehouse to take the place of the Sunset receiving shed destroyed by fire a few weeks ago. According to the present plans the new structure will be of steel frame, and will probably be covered with galvanized iron to make it absolutely fire-proof. As the warehouse has been three times destroyed by fire, it is the determination of the officials to break the "hoodoo" and build a warehouse this time that will be fireproof.

Olympic Club Five Stories.

Five stories, not nine as stated in the daily press, will be the height of the new home of the Olympic Club, and reinforced concrete will be the material used. The building will occupy the site of the old Olympic Club quarters, with an additional lot now owned by the club. The latter has received its insurance in full, amounting to nearly $300,000, all of which, with an additional $100,000, will be spent on the new building. William G. Harrison is president of the Club and chairman of the building committee, and Henry A. Schulze is the architect. Work on the building will be started about January 1st.

BUILDING REPORTS

Six-story building, Stockton street, San Francisco.
Architects—Oliver and Foulkes, Eddy and Franklin streets.
Owner—Scott & Van Arsdale.
Cost—$100,000.
This building will replace the old Monarch building, which was burned. It will have a steel frame with brick walls and plastered exterior. The building will contain stores and offices.

Warehouse, Front street and Broadway, San Francisco.
Architect—Albert Farr, 2053 Sutter street, S. F.
Owners—Owens & Unger.
Cost—$125,000.
This building will be six stories and absolutely fire-proof. It will be built of reinforced concrete with metal window sashes and door frames, wire glass windows, etc.
The Pacific Cement Construction, second floor Monadnock Building, have just been given the general contract.

Five-story building, Jessie and Stevenson streets, S. F.
Architect—William Curlett, Mutual Bank Building, S. F.
Owner—R. McElroy.
Cost—$100,000.
Two bids will be taken on this building, one for brick walls and reinforced concrete floors and partitions, and the other for entire reinforced concrete construction.

Residence, Fair Oaks, Cal.
Architect—Albert Farr, 2053 Sutter street, S. F.
Owner—Edward Pringle.
Cost—$20,000.
This house will be of reinforced concrete and will have all modern conveniences, including elaborate heating and lighting fixtures.

Office building, Market street, S. F.
Architect—Herman Barth, 2500 Fillmore street, S. F.
Owner—B. Schwatzer.
Cost—$65,000.
Bids are now being taken for this five-story brick building.

Theater, Thirteenth street, Oakland.
Architect—Walter J. Matthews, 967 Broadway, Oakland.
Owner—W. J. Laymance, President of Laymance Real Estate Co., Oakland.
Cost—$125,000.
The plans call for a four-story brick and stone building, with an elaborate entrance of stucco work and electric lights. The building will be 80 by 200 feet and will seat 2000 persons. The Orpheum Company will take a ten years' lease of the building.

Hotel, Sutter and Gough streets, S. F.
Architects—Salfield & Kohlberg, 1039 Buchanan street, S. F.
Owner—E. L. Goldstein Company.
Cost—$225,000.
The building will be four stories, with pressed cream-colored brick and terra cotta exterior, and will contain 260 rooms with 150 bath rooms. The main entrance will be thirty feet wide, with a vestibule of green marble and a lobby of the same material. Every room will be equipped with telephone, electric reading lamps and patent wall beds.

Twelve-story Class A building.
Owner—Metropolis Trust and Savings Bank, S. F.
Cost—$450,000.

The building will have a steel frame and will be faced with stone. The location is the corner of Market, Montgomery and Post streets. The bank will occupy the ground floor, the rest of the building being converted into offices. The name of the architect has not yet been given out.

Temporary Theater, Van Ness avenue and Grove street, S. F.
Owners—Gottlob, Marx & Co.
Cost—$25,000.
As it will take two years to complete the Columbia Theater, the managers have decided to erect a temporary frame playhouse at once. It will have a seating capacity of 2000 and will be completed in 90 days.

Five-story business block, southeast corner of San Pablo avenue and Seventeenth street, Oakland.
Owner—William A. Barrett, Oakland.
Cost—$170,000.
Architect—Not yet selected.
Mr. Barrett has just bought the lot and he intends to have plans drawn at once for a substantial, up-to-date business building. Albert S. Day, of Oakland, will give further details.

Hotel alterations, San Jose.
Architect—W. H. Weeks, Merrimac Building, San Francisco.
Owners—Vendome Hotel Company, San Jose.
Cost—$75,000.
Plans are now being drawn for extensive alterations to the hotel, which was badly wrecked by the earthquake. The interior will be elaborately finished.

Three-story frame building, Broadway and Vallejo streets, San Francisco.
Architect—Charles J. Rousseau, 820 Stanyan street, San Francisco.
Owner—H. M. Rogers.
Cost—$40,000.
The building will be used for hotel and store purposes and will be modern in every way. It will occupy a lot 68x137 feet.

Three-story brick building, First street between Minna and Howard streets.
Architects—Miller and De Colmesnil.
Owner—E. B. Jennings.
Cost—$40,000.
Work on this structure has already begun. It will be of brick and will be occupied by the Worthington Pump Company.

Stores and Rooms, Washington street and Stout alley, San Francisco.
Owners—Eastman-Lewison Company, real estate dealers.
Cost—$40,000.
Plans for this building are now under way. There will be three stores on Washington street and four on the alley. There will be 135 rooms.

Two-story building for offices and stores, Kearny street to Webb and California street to Sacramento.
Architects—Miller and De Colmesnil.
Owner—Rudolph Spreckels.
Cost—$60,000.
The structrue will be of brick, with walls sufficiently strong to carry two more stories. The building will have an arcade running from Kearny street back to a second arcade. There will be twelve stores and 85 offices.

Church, 317 Seventh street, San Francisco.
Architect—S. Andrio.
Owner—Greek Society.
Cost—$20,000.
The building will be of frame construction, ornately decorated, the dome and roof being supported by eight pillars. N. Damianakes is president of the Society, which meets at 1735 Market street.

Four-story frame building, north side of Sixteenth street, west of Spencer street, San Francisco.
Architect—H. G. Corwin, 2215 Bush street, San Francisco.
Owner—Mrs. Hannah Power.
Cost—$40,000.
The building will contain six five-room flats and two stores.

Brick hotel, west side of Dupont street, near Pine.
Architect—Chas. J. Rousseau.
Owner—Name withheld for present.
Cost—$45,000.
The building will be three stories, of brick and terra cotta.

Twelve-story office building, Fourth and Jessie streets, San Francisco.
Architects—Stone & Smith, Midway Building, San Francisco.
Owner—Richard Garnet.
Cost—$150,000.
Plans are being finished for a handsome office and store building, class A, of brick and terra cotta, high speed elevators, etc. Additional data will be given later.

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MR. FITZPATRICK WOULD TAX BUILDERS OF FIRETRAPS

There is a fund of good common sense in Mr. F. W. Fitzpatrick's article on "The Municipal Encouragement of Better Buildings," printed elsewhere in this magazine. Coming as it does from one so eminently qualified to speak on this subject, Mr. Fitzpatrick's paper deserves careful, intelligent perusal, and we feel confident that you will agree with us that the suggestions he makes are practical. Mr. Fitzpatrick taxes on a sliding scale, arranged according to class of buildings—Class A, Class B, and so on. He would have the minimum rate assessed against the very best buildings, while structures of inferior design and poor construction, he would have taxed to the maximum rate.

The fundamental purpose of this sliding scale is to encourage the erection of better buildings and at the same time serve as an incentive to the general improvement of property and the elimination of the so-called firetrap. The insurance companies could help along the good work by making their rates on poorly built buildings prohibitive. Thus the property owner would be virtually compelled to build well. It would not cost the city one cent to adopt this plan. The argument that the municipality would, under Mr. Fitzpatrick's sliding scale plan, receive less money in taxes if all buildings were constructed along fireproof lines, is offset by the fact that with good buildings a very large percentage of the expenditure now incurred for fire protection could be dispensed with.

* * *

POOR CONSTRUCTION

While the volume of building in San Francisco since April has equaled, if not exceeded, the expectations of the most optimistic, still it has not been all that one could wish, especially from an architectural standpoint. We fully agree with Mr. Theodore Starrett in the October Architect and Engineer that shelter must first be given our people, and after that there is time to build permanently. But there has been a tendency to build structures that are neither permanent nor temporary. Buildings have been thrown together hastily on old foundations with brick taken from the ruins. In some cases part of the old walls which stood the fire and shake have been used without so much as a girder or beam to strengthen them. There are numbers of instances where burned steel has been straightened and painted and put into new buildings without any thought as to the ultimate consequences. This sort of thing should not be tolerated, especially in the business section of the city. Not only are such structures a menace to the safety of those who must work and live in them, but they are an eyesore to the neighborhood and a disfigurement to the street.

If San Francisco had an intelligent, honest government such abuse of the building laws would not be countenanced.

* * *

NO CITY BEAUTIFUL

San Francisco is not to be the City Beautiful after all. The Burnham plans will not be followed except possibly in a very remote manner. It is really too bad that the civic pride of our city officials, if they possess any, could not have been aroused sufficiently to have encouraged, yes insisted, upon the carrying out of at least the main features of Mr Burnham's splendid scheme. But the city government is not alone to blame. Property owners who were heard to shout loudest for wider streets, boulevards and spacious parks have, we regret to say, been the very ones to block the beautification scheme. This opposition has been most pronounced in the business section, where it was desired to widen certain streets and build new structures with some degree of harmony about them all.

It was thought that architects of adjoining buildings about to be erected might be able to influence owners to sacrifice their individual preferences in the interest of a pleasing architectural effect to this or that thoroughfare, but efforts in this direction have been unsuccessful, simply because the owner did not care to give up any of his property, or put up a building at all like his neighbor's. He would rather have an ugly street with his building exposed to the spread of a possible second conflagration, than surrender a small piece of his lot, or plan his building to conform with others. If we had an administration with any backbone at all, a law would be framed requiring that certain streets be widened, and if property owners rebelled, condemnation proceedings would be in order and the owner could fight it out in the courts.

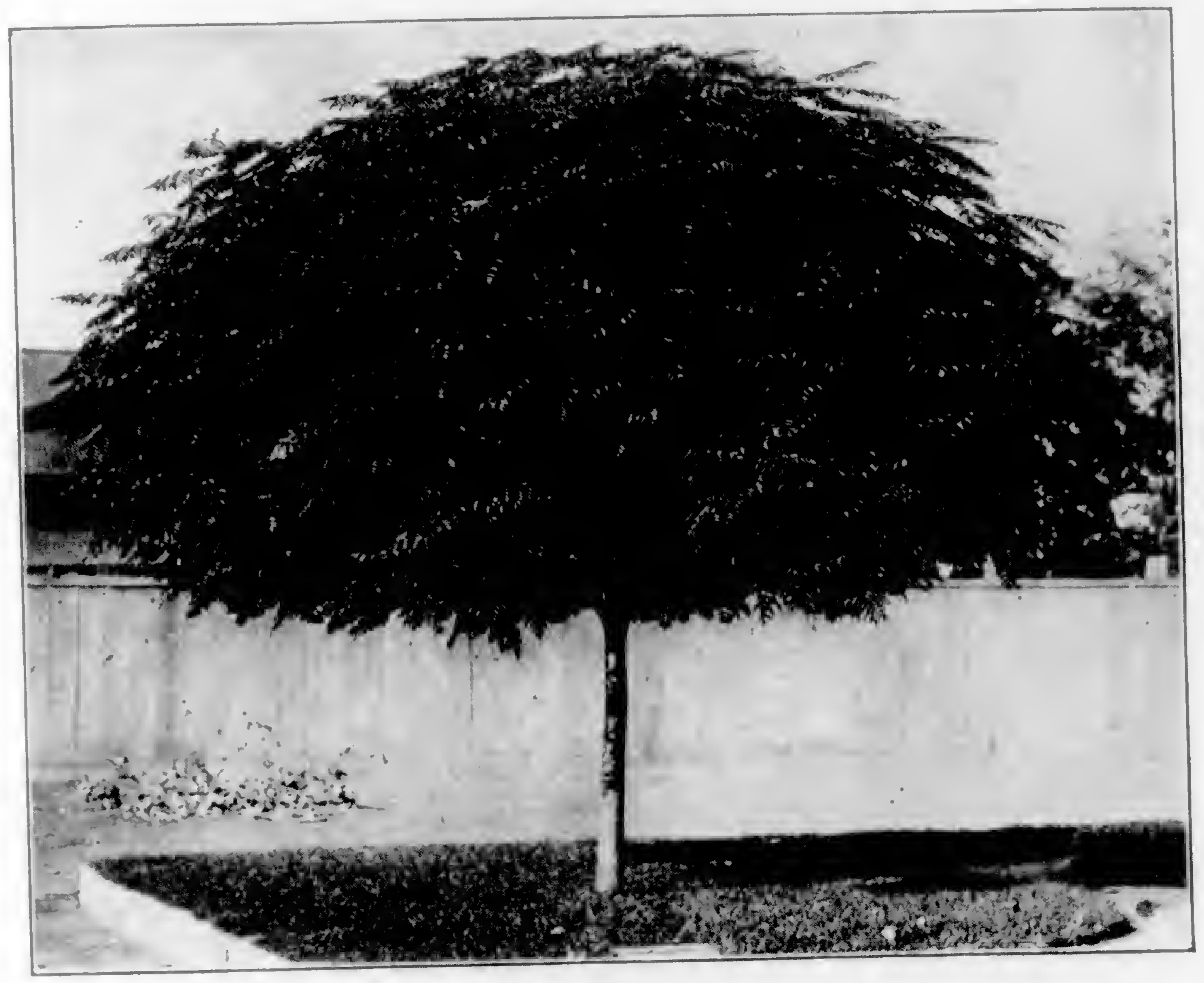
* * *

To Build on Site of Lick Hotel.

Although the Lick House is not to be rebuilt for hotel purposes, it is a satisfaction to know that this large piece of ground, comprising sixty-one thousand square feet and located in the heart of the burned business section of the city, will be occupied by a substantial building that will carry the name of the pioneer miner. The plans for the structure have just been completed by Architects Miller & DeColmesnil, and have been favorably passed upon by Rudolph Spreckels, president of the Real Property Investment Corporation, for whom the building is to be constructed.

On the ground floor there will be thirty-one stores, while the upper story will be finished in one hundred and forty-two offices. Brick will be the material used. There will be an arcade runnnig from Montgomery street to Lick alley and through to Ver Melu alley, which runs to Kearny street. The rear of the stores will have show windows opening on this arcade, allowing a view through the stores.

The Publisher's Corner



A Texas Umbrella Tree

Landscape architecture is a comparatively new departure in California and while still in its infancy it bids fair to become exceedingly popular, especially with the owners of palatial country homes and the proprietors of large tourist hotels, where the beautification of the surroundings are as necessary as the attractive arrangement of the houses themselves. The well-known firm of S. W. Marshall & Son, nurserymen of Fresno, is devoting much time and attention to a landscape gardening department, and the firm has in its employ high priced men whose years of experience is guarantee that only the best results shall be given. Original plans and designs, of any work, with estimates, will be cheerfully submitted. Close observation of soils and climatic conditions enables the Marshall staff to give practical and valuable advice to any one wishing to plant out a new place or remodel an old one. The firm can furnish all kinds of ornamental stock and if desired will plant, prune and take care of the same until it is thoroughly established.

The list of ornamental trees handled by Mr. Marshall is a long one and includes such varieties as have shown a tendency to thrive in the California climate. The illustration on this page shows a Texas umbrella tree in flourishing condition. It is, indeed, a beautiful tree, remarkable for its extensive foliage and one of the best shade trees readily grown in almost any soil. As the name implies, it resembles a gigantic umbrella, and its bright, dark green leaves and sweet lilac-colored flowers make it a most attractive addition to one's garden or lawn. Mr. Marshall will be pleased to mail his latest Catalogue, profusely illustrated, to any reader of the Architect and Engineer. His address is P. O. Box 161, Fresno, Cal.

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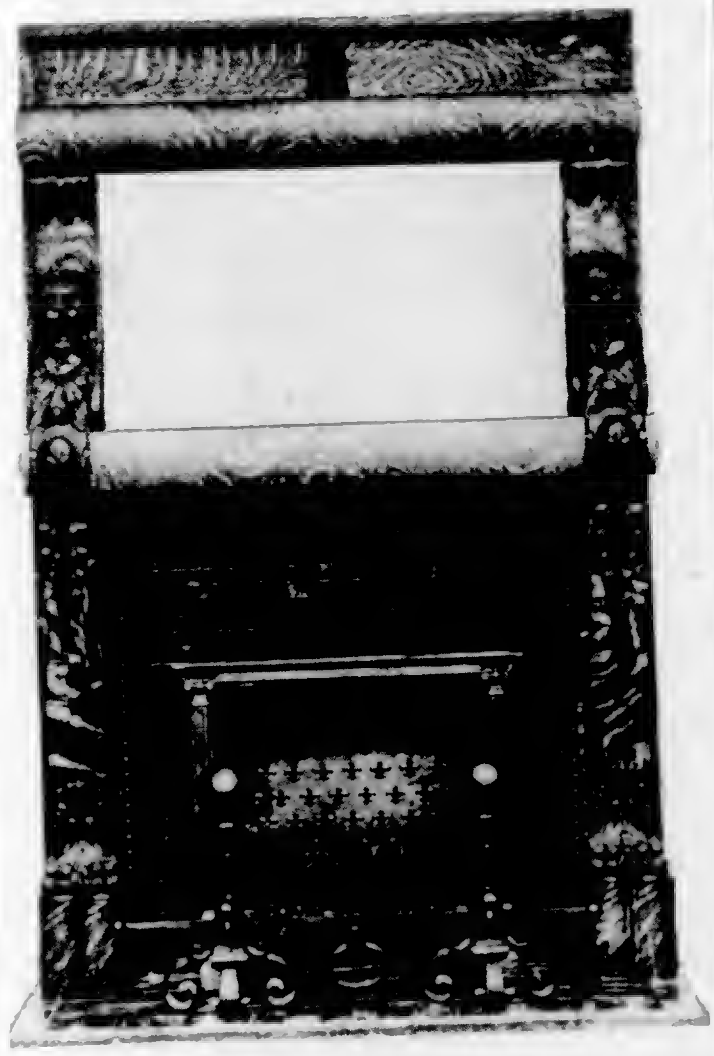

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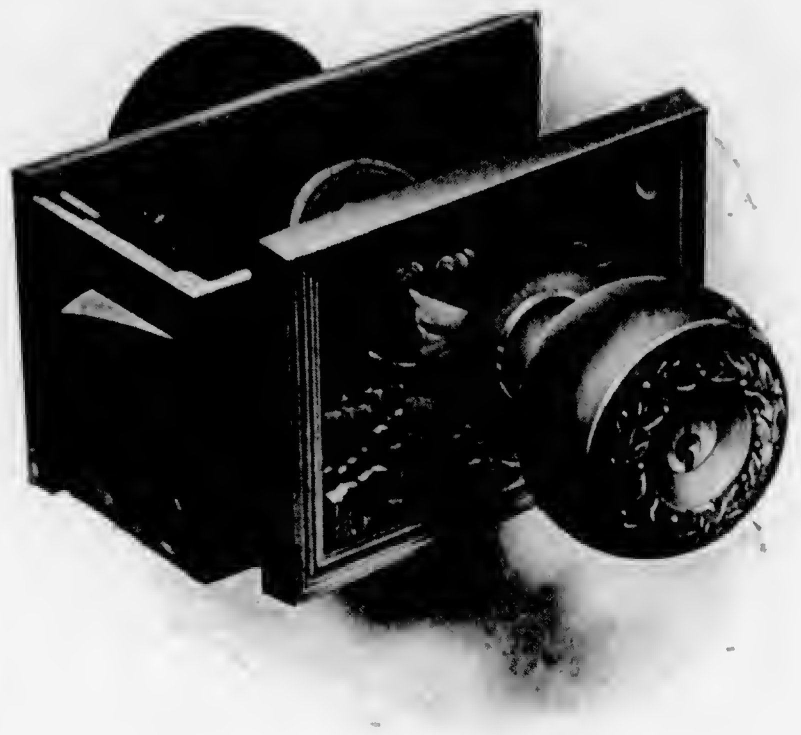

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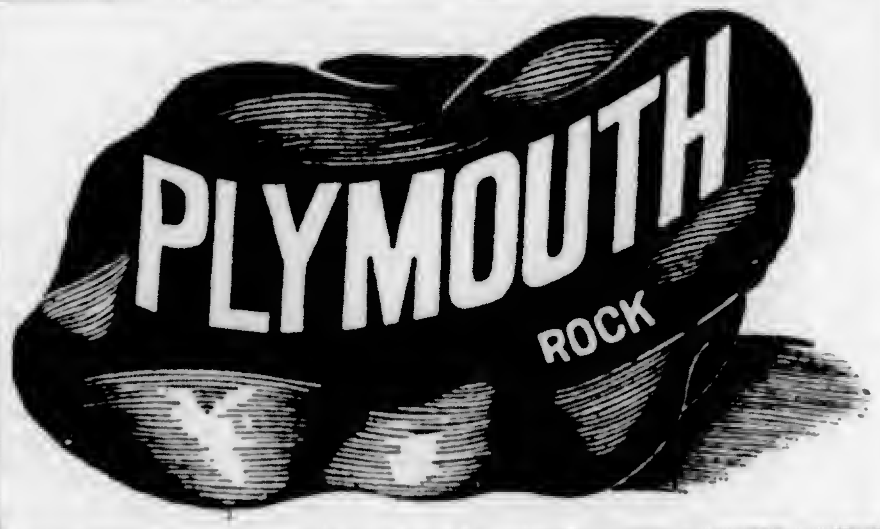

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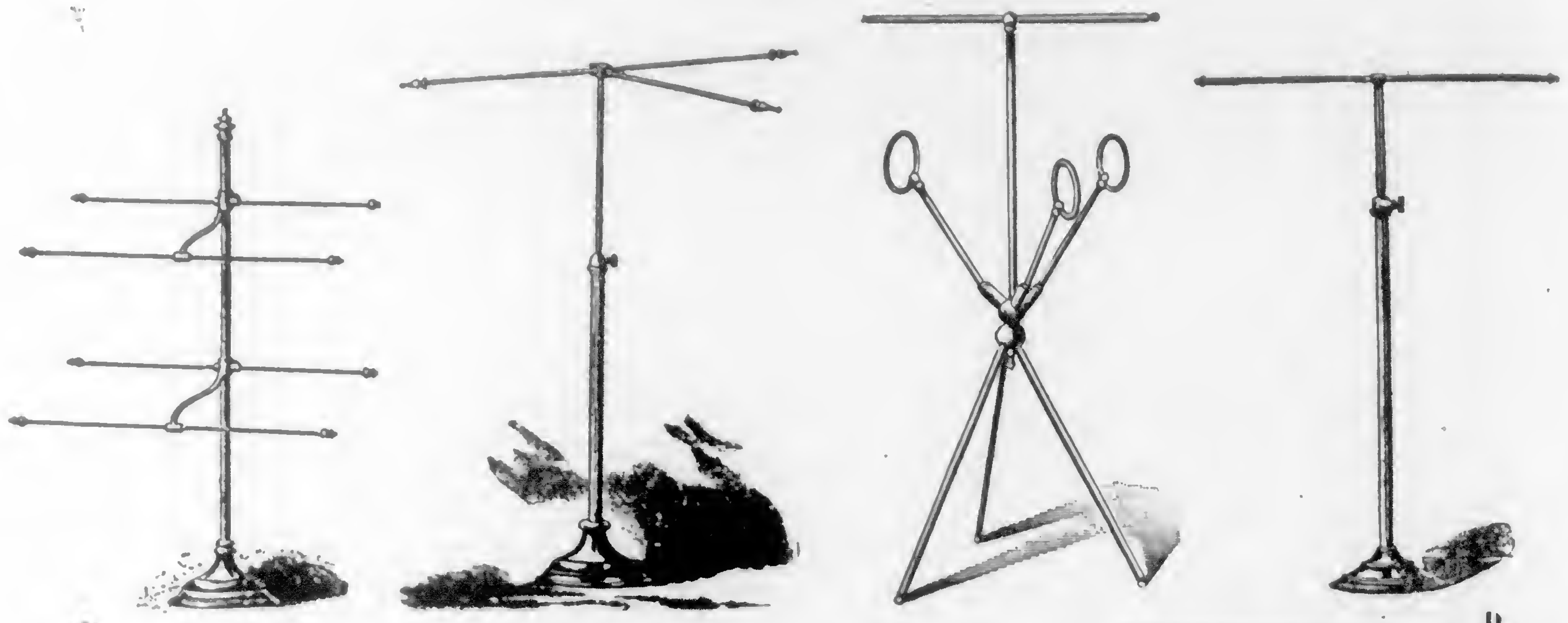

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W. F. Barnes, president of the sewer pipe and terra cotta works of the California Brick and Clay Manufacturing Company at Antioch, reports that the factory is now in operation. The company has an abundance of excellent pottery clay close to the works. The intention is to produce as fine a pipe, hollow tile, brick and conduits at Antioch as can be made in the United States, and to that end the most carefully selected clays and the best modern equipment are used.

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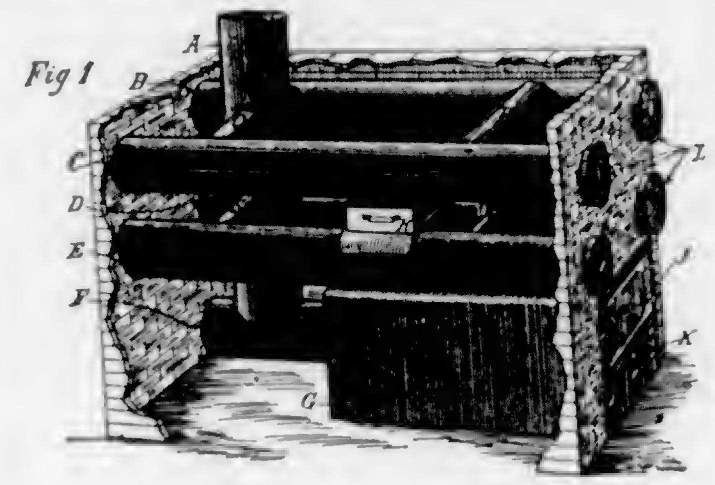

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Clean, Reliable, Simple, Economical
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All Steel Waterproof Doors
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San Francisco, Cal.

Their first kilns of sewer pipe certainly leaves nothing to be desired. The pipe is straight and very strong. taking remarkably fine glaze, inside and out.

Hand in hand with manufacturing, the construction work at Antioch goes steadily on. The foundations are being laid for a brick building 150x75 feet to be used as a dry room. This structure will be ready for use by the time the rains set in, and will give an abundance of dry floors during the rainy, damp, winter months, enabling the plant to operate to its full capacity the whole time. New kilns are to be added just as rapidly as the work can be done.

Of course all of the brick used in the buildings or kilns will be made at the company's own plant, and they will also make their own fire brick for the kilns.

The main building is completed and in use. The machinery has been installed there and is in full operation.

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The California Brick and Clay Manufacturing Company is now ready to make deliveries of anything in the sewerpipe or terra cotta line, including chimney pipe and flue lining, and can ship in carload lots or in smaller quantities via the Southern Pacific, Santa Fe, or by boat.

Communications should be sent either to Antioch, or the San Francisco office, W. F. Barnes, President, 2301 Scott street.

Cement on the Way

Attention is called to Mr. A. Breslauer's advertisement on page 93, to the fact that a cargo of the excellent cement Gillingham is due to arrive in San Francisco on the Steamship Suverie from London, Eng., on or about December 12, and it would be beneficial to intending purchasers to order of Mr. Breslauer at once.

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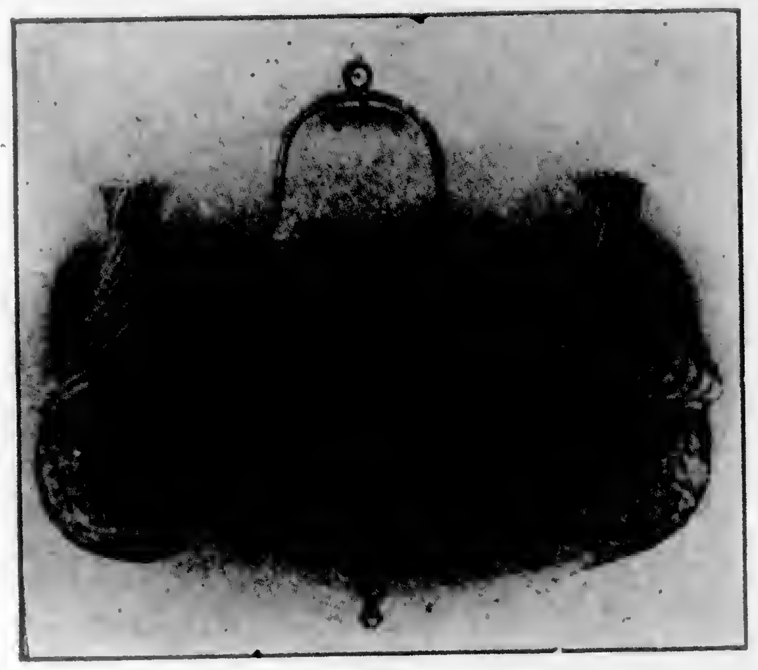

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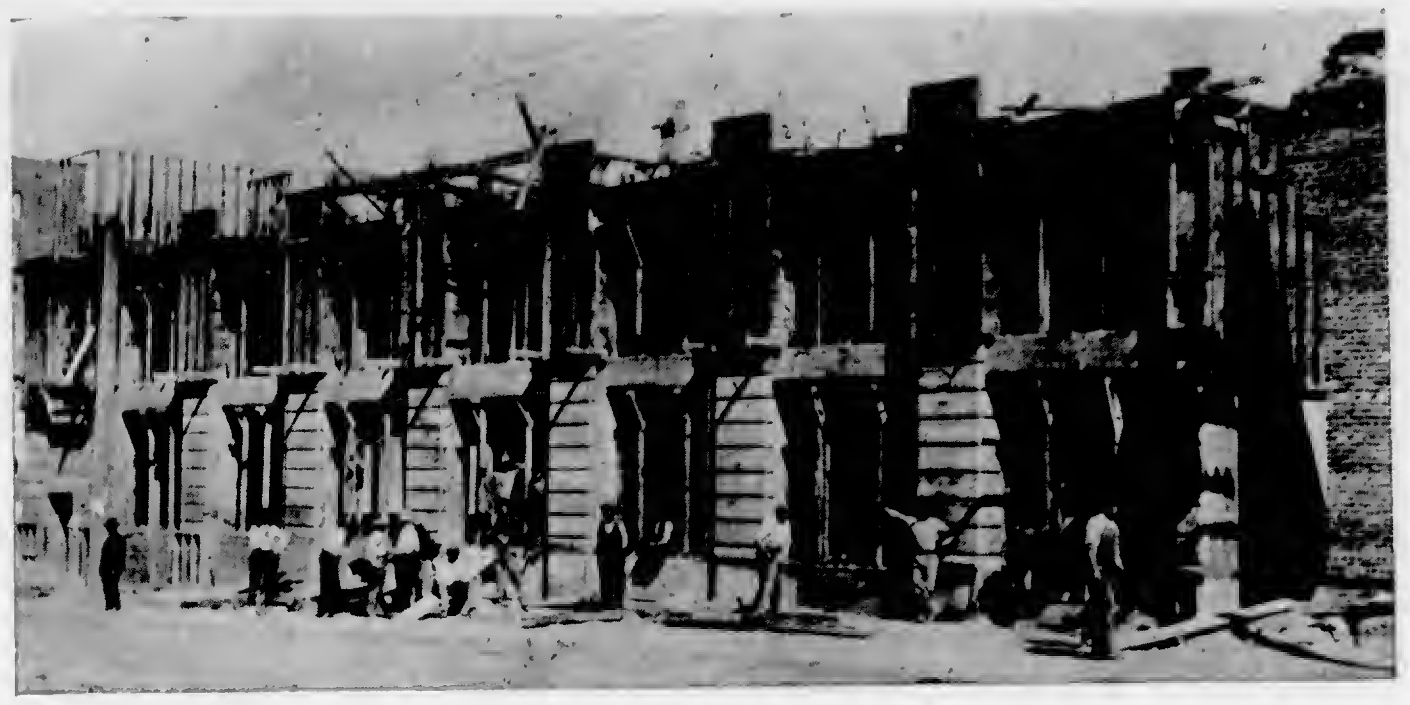

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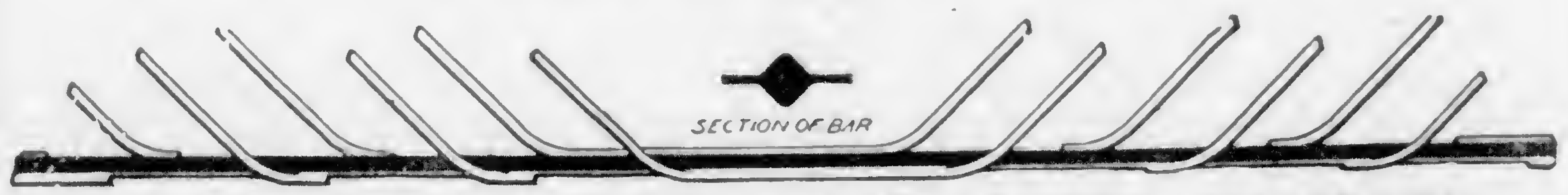

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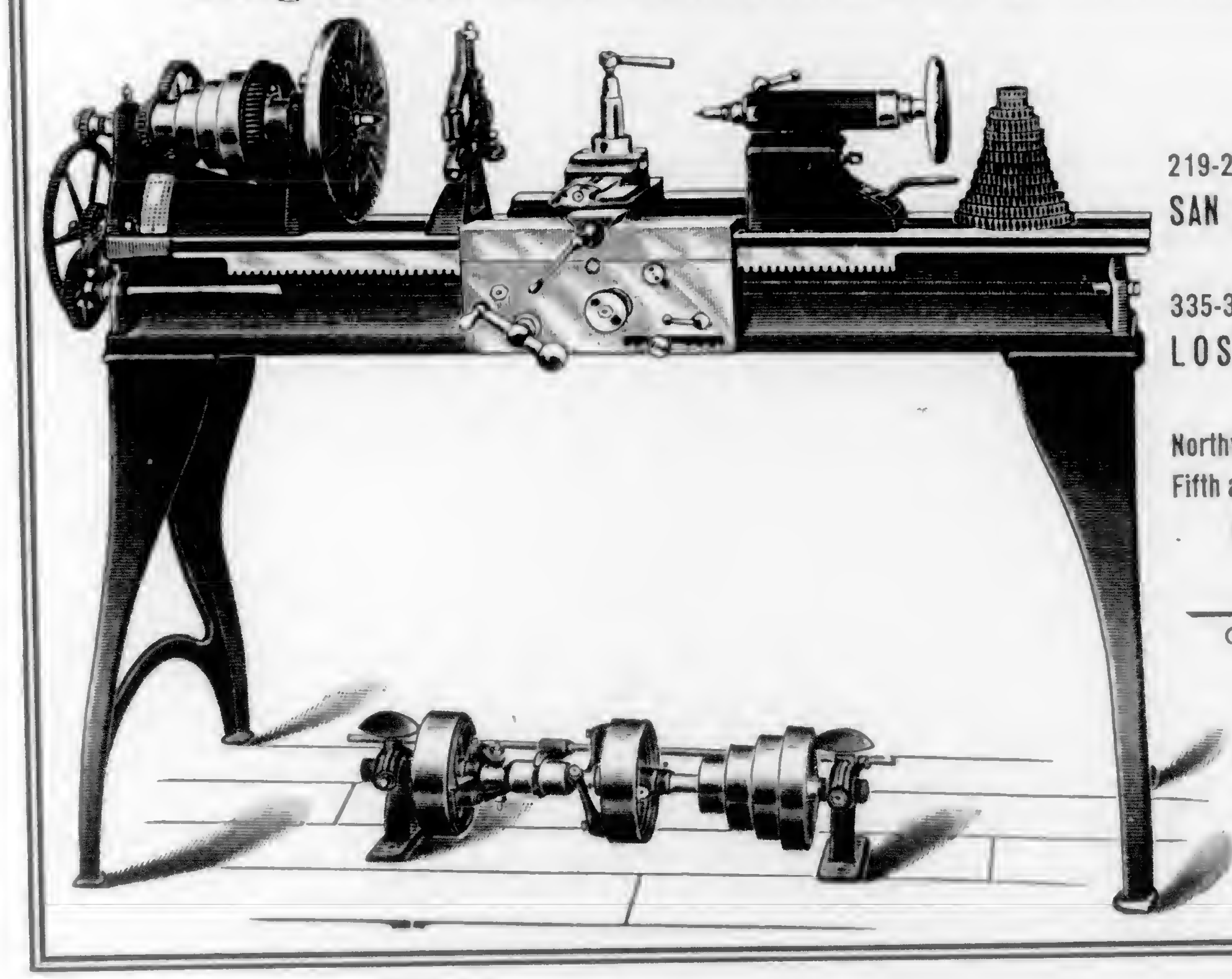

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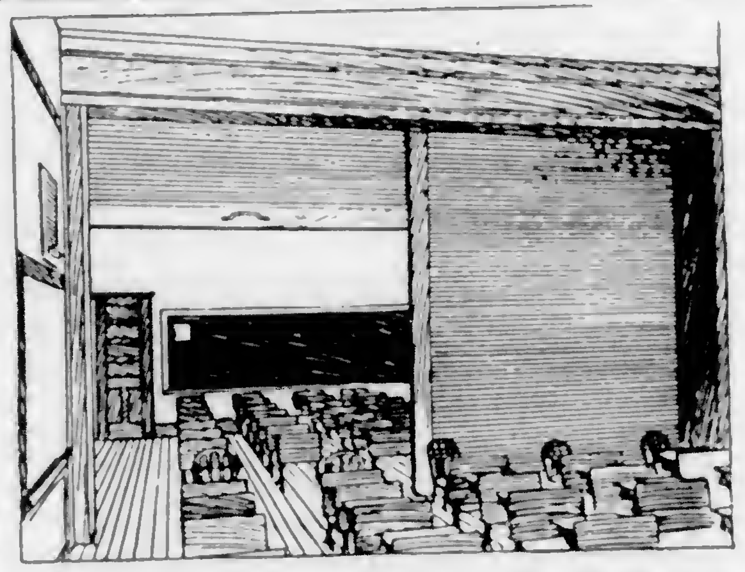

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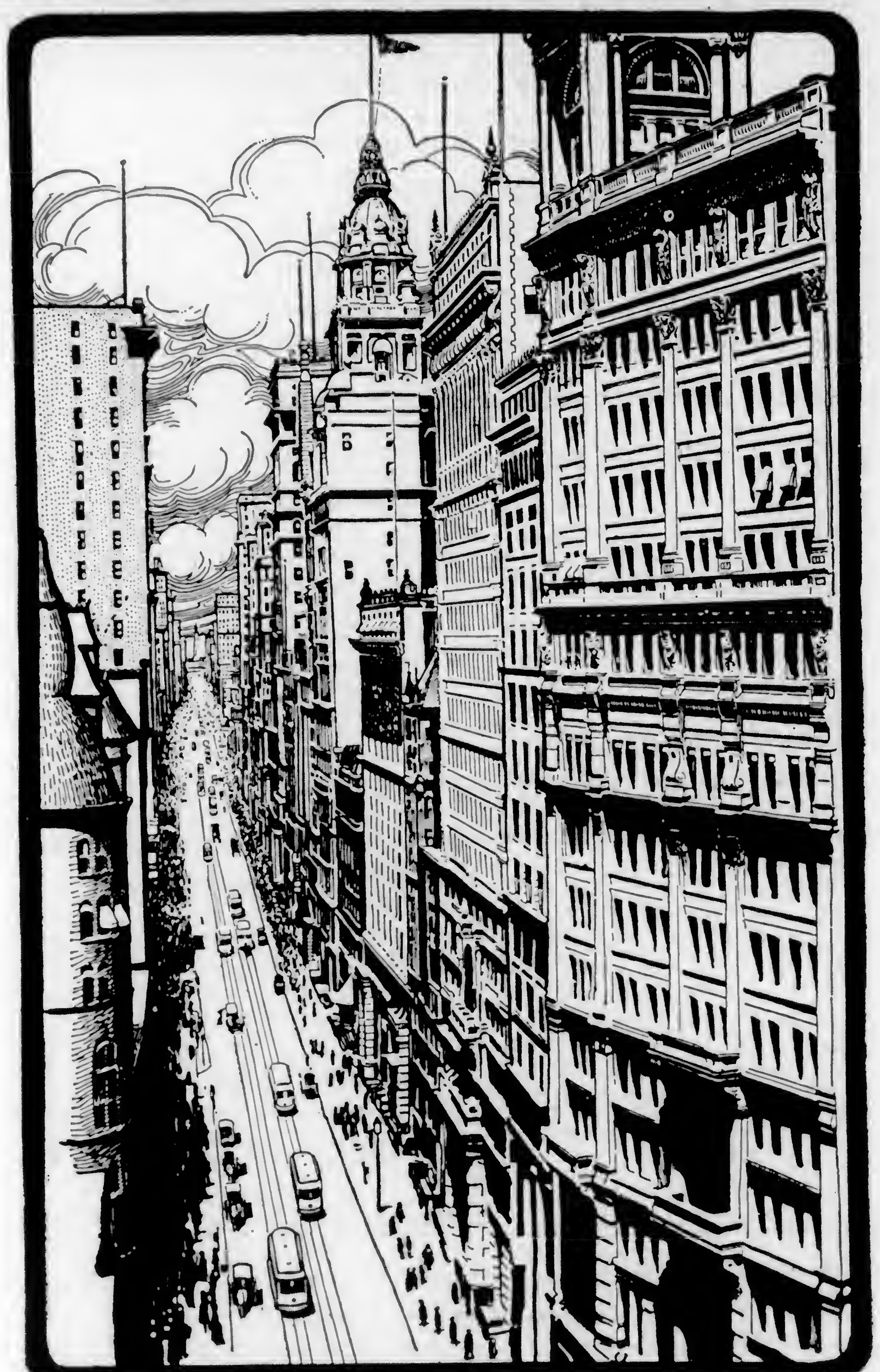

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Mar. 15, '03	2,232,582.94
Sept. 15, '03	2,629,113.39
Mar. 15, '04	3,586,912.31
Sept. 15, '04	3,825,471.71
Mar. 15, '05	4,349,427.92
Sept. 15, '05	4,938,629.05
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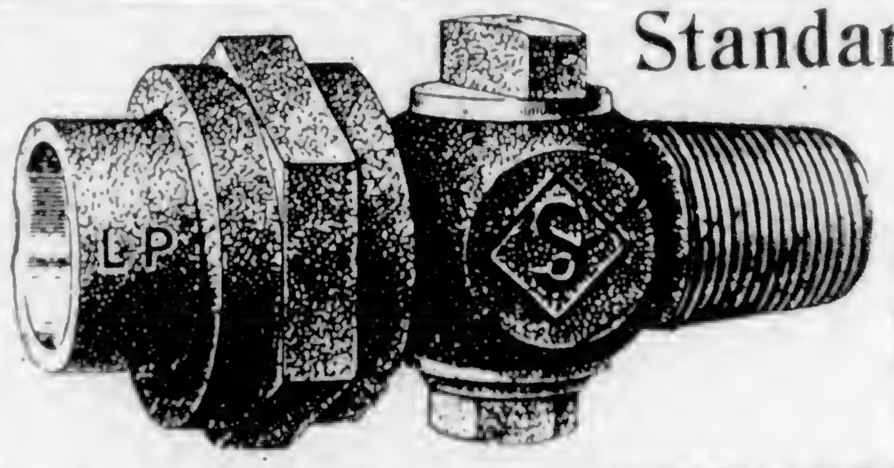

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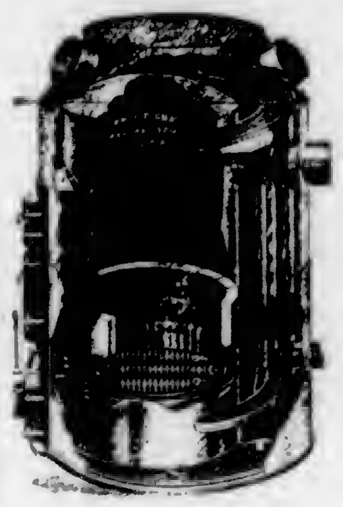

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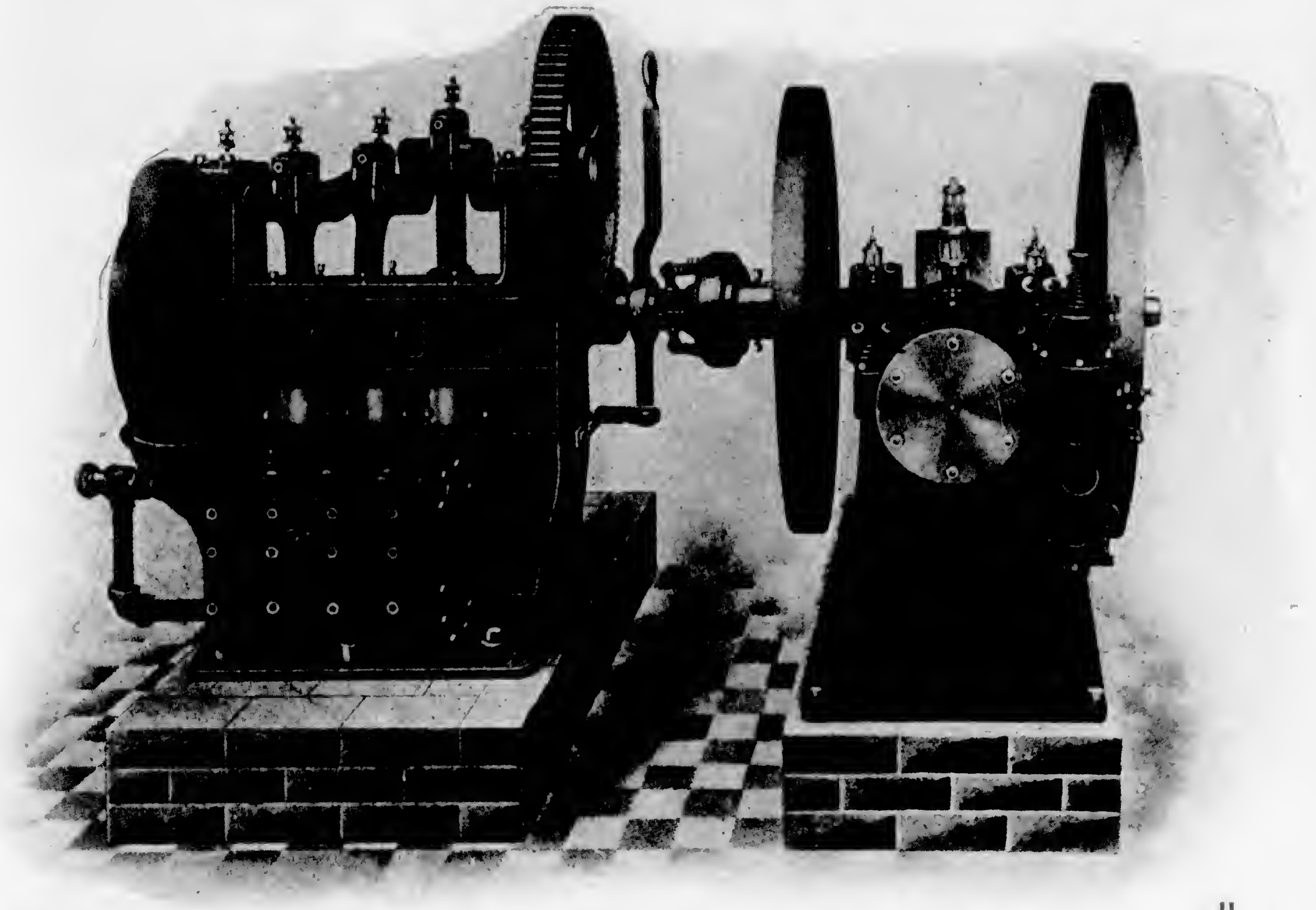

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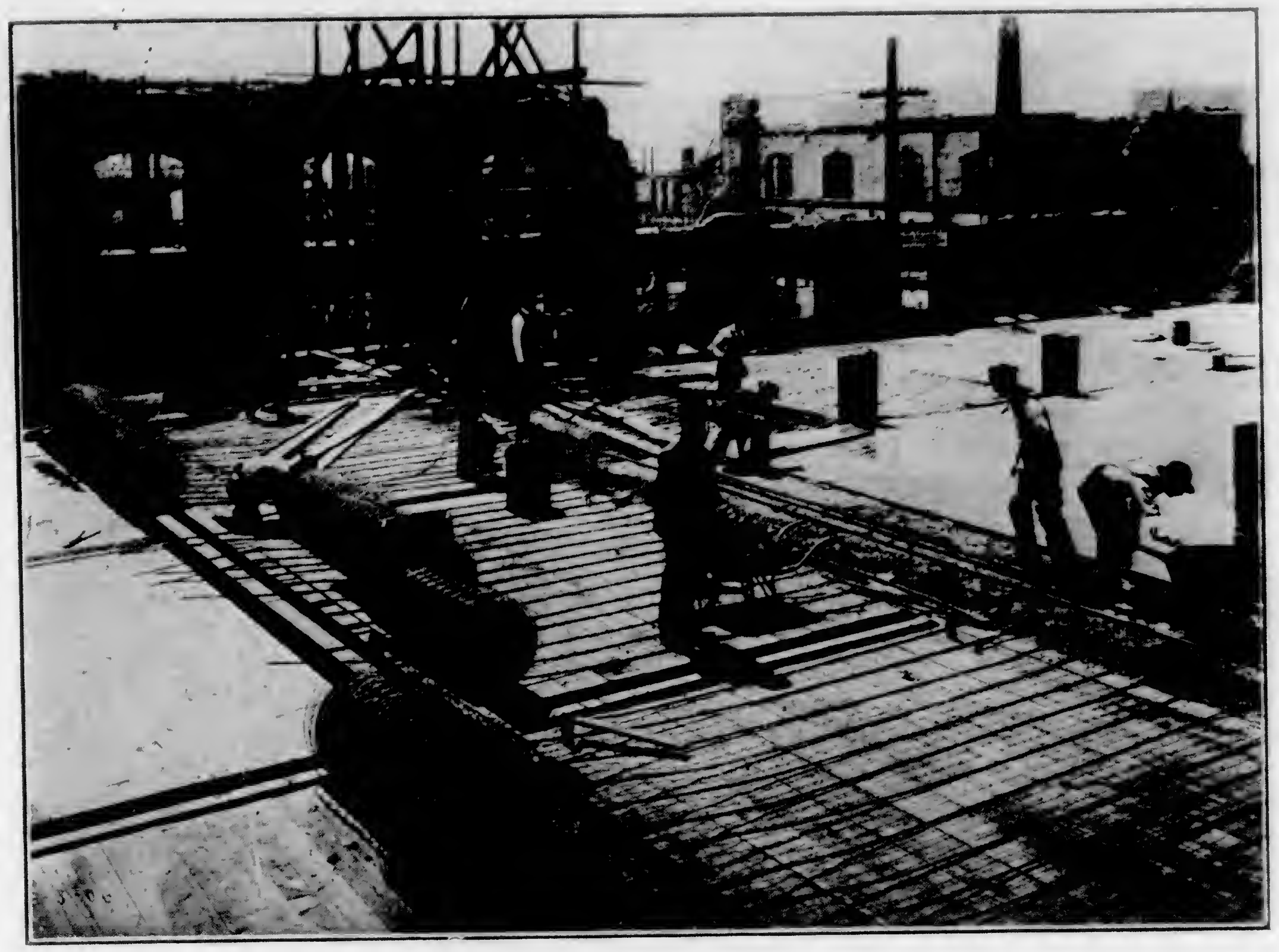

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SAN FRANCISCO

The Architect and Engineer
Of California

Issued monthly in the interests of Architects, Structural Engineers, Contractors and the Allied Trades of the Pacific Coast

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Contents for December

PAGE
Frontispiece **Mr. William H. Hall, C. E.** - - - - - - - 18
Municipal Engineering —Its Relation to City Building *William H. Hall* 19
The California Country House - - - - - - *Herbert D. Croly* 24
Editor of The Architectural Record.
Competitions in San Francisco - - *W. Garden Mitchell, Architect* 40
The Ray Memorial An Unusual Library *Theodore H. Skinner, Architect* 43
A California Concrete Residence - - - - - - - - - 49
Brick and Terra Cotta The Bixby Hotel Disaster as Viewed by a Brick Man - - - - - - - - - *Joseph Simons* 51
Concrete vs. Burnt Clay - - - - - - - *Uriah Cummings* 53
Author of "American Cements."
Apartment House for Nob Hill - - - - - - - - - - - 55
Cement and Concrete - - - - - - - - - - -
A Plea for Good Cement Tests - - - - *Irving C. Allen* 57
Uniformity of Design and the Proper Placing of Reinforcement *S. A. Jubb, C. E.* 59
Fire Protection Installation of Sprinkler Systems - - *J. A. Loeb* 63
The Failure of the Bixby Hotel Official Report to San Francisco Cement Workers' Union - *Henry A. Shulze, Architect, and T. E. Keough* 67
Interior Decoration The Decoration of a Hotel - - *C. Walter Tozer* 74
DEPARTMENTS **Among the Architects** **Editorial** **Publisher's Corner**

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Author of "American Cements."

Apartment House for Nob Hill - - - - - - - - - - - - 55

Cement and Concrete - - - - - - - - - - - -
A Plea for Good Cement Tests - - - - - *Irving C. Allen* 57

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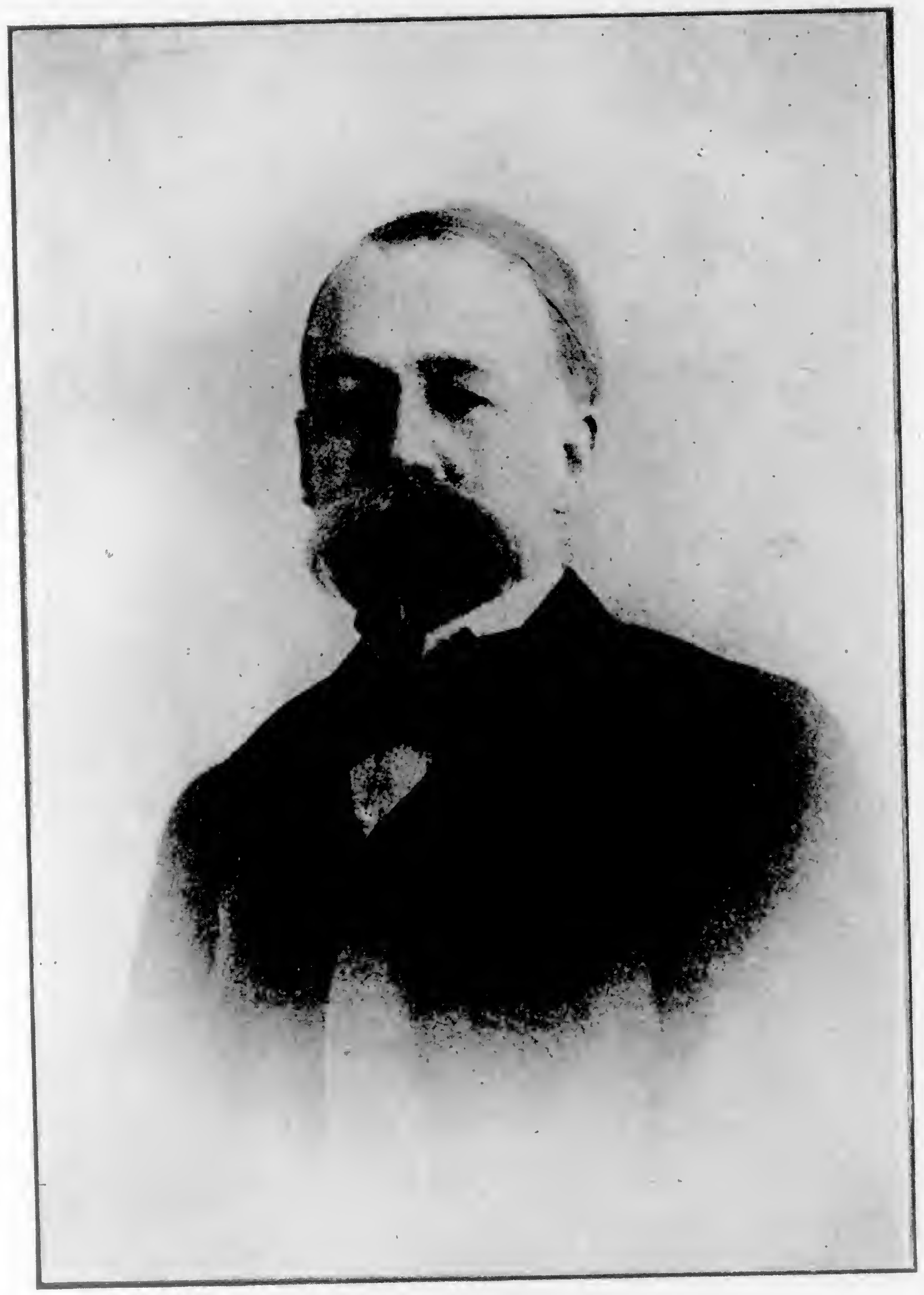

MR. WILLIAM H. HALL, C. E.

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Municipal Engineering—Its Relation to City Building

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By WM. H. HALL, C. E.

WHETHER we assume that in this connection engineering includes, or is itself embraced by architecture, the fact is that the works of the architect and of the engineer in building a modern city are so closely interwoven that one cannot be written about without running into the claimed limitations of the other, on almost every important part of the subject. The day has passed when the appellative, Municipal Engineering, can be restricted to works of sewerage, water supply, street pavements, and the like, as it was limited several decades ago. The engineer now is not only the authority on all that goes to make the place on which the visible superstructure of a city rests, including even the foundations and the foundation walls, piers and columns of the buildings themselves, but his duty extends to the designing of those supporting walls or frames, floors, roofs or towers, to the heating, ventilating and drainage of buildings, and the supplying of water, light and elevator service within them. The architect designs that which gives the building its appearance, and arranges it to the special use for which intended. The engineer provides, directly or indirectly, not only the ideas, but often the plans for that which holds the well-appearing shell in shape and for all that relates to these special functions which make it usable and safe according to modern requirements. Of course, this all applies in greatest

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The architect has stood for all that was conservative and bound by ancient precedent in building. The engineer has represented or has himself originated or has formulated and systematized most of those innovations which have revolutionized building construction and have kept the architect busy in adapting the various models or schools of design-for-appearance to new designs for economy, commercial advantage, strength, stability and business or habitable convenience, and to the use of new materials or of materials in novel ways. It is not to be inferred, however, that the engineer has stood for only that which was good or desirable and the architect has been an obstructionist, merely. Truth to tell, the engineer's innovations have often led to sham and the architect's conservatism has often been exercised in the interest of truth and solidity, though according to old standards, in building.

There should not be any friction between architects and engineers, therefore, over what I shall in these articles write of as Municipal Engineering. But there is; and, so, it will be one of my endeavors, incidentally, to say some things which may tend to do away with such friction.

The fact is that the very modern development of the building art has been along lines which have compelled the engineer, directly or indirectly, to invade the claimed business domain of the architect, and the latter has resented the intrusion. This condition has been more or less acute, by comparison, in some Eastern cities for a number of years, but it had not attracted public attention on this coast until the earthquake of April last demonstrated the fact that San Francisco would have been safer had there been more engineering design, supervision and building practice in the city's making than to that time had been admitted. Since then conditions seem to be changing in this regard. Let the engineers and architects remember that they are jointly the conservators of public safety and of all that on which municipal pride may be founded in these matters, and that it is necessary for them to stand together in keeping within bounds the tendency towards imprudent economy, greedy commercialism and dishonest construction, which too often take hold of the owners and contractors for building and for materials.

The engineers are at a disadvantage however, in that their work is often specialized and coupled with commercial and construction interests. But this fact makes it all the more necessary for the profession as a whole, to strive to uphold the purely professional in practice as connected with all that constitutes municipal engineering as this term must be applied.

The thorough engineer is ever an inventor. His whole life is spent in "adapting the forces of nature to the use and betterment of mankind." That is what civil engineering is, as defined by our highest authorities, and that practice leads directly to origination of new ideas, formulation of new designs and arrangement of new devices in order that some one of such natural "forces" may be adapted to some new use or some additional human betterment under some novel conditions. This constitutes invention. Invention forces innovation upon the formulated practices of the past. Unfortunately, the thinker along progressive lines seldom has opportunity personally to introduce to his real beneficiaries the concrete results of his thoughts. The engineers who have worked out the technical problems and made the stock designs on which the outputs of great factories and the adaptations of such outputs are based, are generally not known beyond the managements of their works. And yet they are, in a very high sense, engineers of important parts of the structures into which such factory outputs are incorporated. The civil engineers of a few years ago whose technical and practical ideas and practice results have been incorporated into and largely constitute high-class building practice today, are not known to building fame outside of the profession, and civil engineers of the present day who are continually originating and contributing construction ideas to the technical press or society proceedings are not known to the general public otherwise than as civil engineers in the sense of surveyors or field engineers. In this regard the civil engineer is at disadvantage with the architect, which latter professional man collects the outputs of many professional and practical brains, most of which are of engineering character, arranges these in an attractive form, following some of the very many styles of architectural design, and erects the material structure within the sight of a multitude of men, who say: "A find appearing building. Who was the architect?" Now, this is a creditable performance, and a man or set of men who for long continue to carry it off are to be admired. If the civil engineering profession is a sufferer thereby the engineers are alone to blame for it.

The civil engineer is the progenitor of modern construction methods and planning. The term civil engineer is inclusive of all the other specialist engineers of the present day, and it is unfortunate for the entire body of engineering votaries and practitioners that the action of some of our universities with respect to special courses, has been taken as excuse for the disintegration of a noble profession. For, the specialist having to do with electricity, or machinery, or building construction, sometimes forgets himself, denies his birthright, so to speak, and assumes to interpret civil engineering as something other than that which has to do with his specialty. Thus, there are those who having specialized on some line of building construction, are prone to separate themselves from the great body of their profession, the parent body of civil engineering. And so, of late years, we have a new technical man, who is or should be a civil engineer, but who calls himself a structural engineer. However good engineers and good men these be, we cannot help thinking that they may unduly devote brain power to the technical, at the expense of the ethical part of their professional lives. Else, why do they make such a mistake? It were a matter of impossibility to pluck from the domain of civil engineering that which is called structural engineering. We but injure ourselves before the public when we attempt it.

If we must be known in close connection with that branch of civil engineering to which we have devoted particular attention, why can we not yet claim membership of the great inclusive profession, and make it known that we specialize on this, that or the other part of it? This course would be reasonable, dignified and strong. But, when in apparent eagerness to be accounted expert in something, we call ourselves specially that kind of an engineer, our attitude is not reasonable, not dignified and not strong. When we assume such position we are at a disadvantage, professionally, with the architect and before the public; and so, we are taken advantage of by the former and are misunderstood and are underrated by the latter.

Is not this tendency to cut off parts of the civil engineering profession akin to those attempts to divide up the practitioners of the law, upon which the body of the profession, including its leaders, looks down, and which gives rise to such names as "land lawyers", "criminal lawyers", and "divorce lawyers"? Observe, that sort of thing does not win in the law. The great land, criminal and divorce cases are conducted by those who simply style themselves attorneys at law, and who have not segregated themselves into the ranks of the petty specialists of the profession. And, again, the leading and authoritative practitioners of medicine do not feature themselves as specialists on liver, kidney or bowel troubles, neither do they advertise as tape worm doctors, in order to assert their ability to treat diseases of those organs or to expel such parasitic presences from the human anatomy.

There are lots of good people in this world who stand in their own light because they do not stop to see whence the effulgence emanates. There are many good engineers who belittle themselves and their profession by just such thoughtlessness. It is not necessary for a man to be an adept in all branches of civil engineering in order to be a civil engineer. Understanding the principles and the basic rules of his profession as a whole, he may specialize in one or more of its divisions; but he should never cease to be in fact or in assertion a civil engineer. If civil engineers had been true to their profession and had entered the field of building construction as civil engineers, upholding the dignity and breadth of that calling, and had not weakened their position by dividing their body and assuming special names, they would have been much further advanced today in the estimation of the public, and that which I am maintaining must necessarily be included in municipal engineering, as a part of the civil engineering calling, would long ago have been recognized for what it is, the most important factor in the building art.

Observe, again: Architects do not class themselves as residence architects, store architects or barn architects. They do not seek notice as structural architects or as decorative architects; nor yet do they divide themselves into architects in different materials, or of the several parts of buildings. They call themselves, simply, architects, thereby maintaining the unity and dignity of an ancient and honorable profession. And yet architects have to do with the whole range of construction, including not only house designing and building, but bridge designing in special cases, and landscape work, both of which latter are certainly civil engineering works.

It comes to this, that engineers, and by this I mean the inclusive civil engineering profession, are themselves largely to blame for not having been earlier admitted to their share of city building practice. The architect, virtually, says to the engineer, and he is dead right in saying it: "If you come into "this business only as a narrow specialist on some class of construction, then "I will hire you as I happen to need you, as an assistant, at a subordinate's pay. "It is not necessary that you meet or be known to my clientele, and I will take "care that you are not. I am a structural engineer as much as you are an "architect. The public looks upon the design and supervision of buildings as "the architect's function. The public will employ me, and there you are. "What are you going to do about it?" This was certainly the situation in California before the great earthquake and fire. The civil engineering profession as a whole is strong enough to combat it and bring about a due recognition before the public of those who seek to specialize, professionally, in building construction work. But it remains yet to be seen how far the dreadful scourge of April last has operated to shake or burn the San Francisco engineer into the place in public estimation which is his due in this regard.

In the measure of their success in this direction the engineers of California are assuming responsibility for city buildings of characters never before tested in an earthquake country. They have no right to assume for a moment that there are not going to be other very severe trials of buildings here. A bridge or viaduct is planned in the certainty that trains will run over it almost immediately it is finished. A building for this Coast should be planned and built with an equal sense that an earthquake may run under it quite as promptly.

It comes to this in building construction: If the engineer is admitted to his claimed place as a participant in the design and supervision of buildings, the architect is relieved of the greater part of the responsibility for the buildings' integrity. From the foundation up, the engineer now assumes to be the expert of all that supports, holds together and tops the structure. This claim must carry with it the major responsibility.

The architect's part of the result is visible—the style, proportions, details and groupings, the selection of materials and adaptation of parts, the special features and general arrangement to the intended use. These are open to view and to commendation or to criticism after the structure is finished. The engineer's part is invisible. Hid below the ground or encased in the shell and finish are the structural members—the bones, cartilages and muscles, so to speak—of the great thing we call a first-class building. If these are not all right it may tumble down some day. This constitutes the engineer's responsibility.

It is related of the older Roebling—strong, brainy man as he was—that his sense of responsibility for planning and constructing the Brooklyn bridge, a pioneer structure of its size and kind, was so great that it was directly responsible for the early break-down which ended his life. One cannot but wonder whether there are many Roeblings among those who are assuming responsibility for new classes of constructions where the ground is apt to move violently and irregularly under them. That we shall have very much in the rebuilding of San Francisco which is creditable, is seemingly assured. But will we escape having some which will be discreditable to the engineering profession? That is the vital question; for the failures, if notable, will attract far more attention and have a greater influence on the future of the city than many times the successes.

But aside from this foregoing line of responsibility for the integrity of a city's great buildings, and even in advance of it, there is another function of the municipal engineer which is of vital importance to San Francisco, not only for the future, but now. This is the designing of a fire extinguishing water supply system. This city is in special danger now of other widespread fires. We do not have to be subjected to another earthquake to make conditions favorable for such disasters; not wholesale burnings of the city at large, of course, but great fires which would constitute serious set-backs to San Francisco in her present condition. Conditions are already favorable for these in a wide and growing expanse of temporary wooden structures filled with inflammable merchandise, in a street system ripped to pieces and in many parts impassable to fire engines, in a water distribution pipe system crippled by the late quake and liable to accident at inopportune times should it be subjected to extra pressure in a great fire fight, and in a community itself demoralized by the heels-over-head rush to rebuild.

The pressing question to which I refer is one quite aside from that of provision of a permanent water supply for general purposes for the city. It is one which cannot possibly wait for solution of the greater question. It is no reflection on the present water works, nor on any contemplated water supply project to say that San Francisco needs to take action at once on a separate fire protection water supply system. What this system should be is a question for the engineering profession. No city ever confronted a more pressing or a more vital one.

Do not these foregoing reflections establish the great importance of municipal engineering to the City by the Golden Gate? a greater importance than the profession ever had, probably, to any other city. I sometimes wonder if the property owners even begin to realize it.

Residence of Mr. Robert C. Gillis, Los Angeles
Myron Hunt and Elmer Grey, Architects

The California Country House*

By HERBERT D. CROLY

THE country house in California is a young and tender plant, which, like many another American architectual sprig, is full of life and promise. The soil is rich, the air is kindly, and the need is great. But the promise of its future is clouded by the fact that it has as yet no sufficiently salient tendency to grow in one fruitful direction. Its energy is partly dissipated by the divided counsels which determine its growth, and Californians will do well to bear in mind that they have less excuse for miscellaneous experiments in the kind of country house they build than have their fellow countrymen in the East. So far as the East is concerned one could hardly give good reasons for asserting that a man ought to build any one kind of country house, because so much would depend upon the neighborhood in which he had happened to buy his land. The bare cold New England hill pastures call for a building differing essentially from the house which one would like to see erected on the flat sandy plains of Long Island, or in the folds of the rich highly-cultivated, and deeply wooded landscape round about Philadelphia. Moreover in the East and in the Middle West, there is at the present time no one style of country house, for which any peculiar authority can be rightfully claimed. Californians, on the other hand, have inherited and have partly accepted such a style—a style which has some authority because it is both local and appropriate; and its peculiar property consists just in the fact of its adaptability to the California countryside. The country in California with all its variety, possesses in its arable parts certain admirable and uniform characteristics which invite the building of a particular sort of house, and inasmuch as this sort of house has already been built to a certain extent upon local soil, Californians are in the fortunate position of having good reasons for remaining faithful to a simple and comparatively familiar style of country house.

It will, I am afraid, immediately occur to some of my readers that the style to which I refer is that of the Missions; but such is not the case. The Mission architecture was ecclesiastical rather than domestic; and the attempts which have hitherto been made to adopt the peculiarities of the Mission style to the designs of contemporary American houses have been almost wholly grievous in their effects. The Missions contained in their architecture much that was beautiful and memorable; but they also contained much that was rudimentary and in bad proportion. If one wishes to disengage the valuable remnant in Mission architecture, one should go back to the originals from which they were derived, for the local variations which the friars made upon these originals were due almost entirely to ignorance, and the necessary lack of proper tools, materials and mechanics.

The one respect in which the Mission buildings may in the end have a useful formative effect upon the design of Californian country houses, lies in the fact that it did stamp the Spanish tradition upon Californian architecture; and the Spanish tradition is only, it must be remembered, a picturesque version of what may in general be described as the Latin or Italian tradition.

This Spanish tradition has left traces of its former sway in California, which are much more useful to the modern American house-builder than are the Missions, viz., the old adobe dwellings; and it is these dwellings which constitute the most valuable and imitable local domestic style. the adobe houses, also, are only distant echoes of the highly and carefully wrought Spanish and Italian buildings from which they were derived; but even when erected in a primitive land and under bad economic conditions, they retain something of the high style of their models. They were long, low, restful structures with salient but gently sloping tiled roofs, over-hanging eaves, enclosed porches or piazzas, and bare stretches of plastered walls. Rudimentary as these buildings were and simple to the verge of attenuation, they reached, both by what they avoided, and by what they effected the essentials of good domestic architecture. They dispensed with mere mannerisms of the Mission buildings, and announced their allegiance to the admirable sources from which they were derived by their acceptable proportions, their strong lines and shadows, and their sharp emphasis of those parts of the building which most deserved it. All low buildings are necessarily and properly matters chiefly of a roof; and the roof was the feature, which was not only a little spectacular, but which, by virtue of its color, ventured also, to be a little gay.

Such was the kind of houses in which the native Californian lived at the time of the American conquest; and if the style it represents should come to have more influence over the houses built by modern Californians our contemporaries would after all only be following the example of the pioneers. When immigrants from the East and the South began to take up the farming land and to build houses of their own, they fortunately copied some of the peculiarities of the adobe house. Of course they substituted wood for plaster; and of course they always insisted on the piazzas to which they were accustomed; but they retained the low lines, the restful effect and the salient roof of the native Californian house.

The new frame buildings were kept one, or most, two stories high; and the line of the piazza roof, if it was not an actual extension of the house roof, always harmonized with the lines of the latter. In this way, the piazza instead of being a useful excrescence, as it generally is on the higher houses in the East, really helped to complete what modest architectural effect it had. Another excellent characteristic of these older Californian ranch houses was the comparatively simple and honest manner in which the wood was treated. Built though they were at the time when the jig-saw was throughout the East malevolently distorting the ornamental woodwork of even the cheapest houses, they escaped by their remoteness the range of its influence; and by reason of this same remoteness there was no temptation

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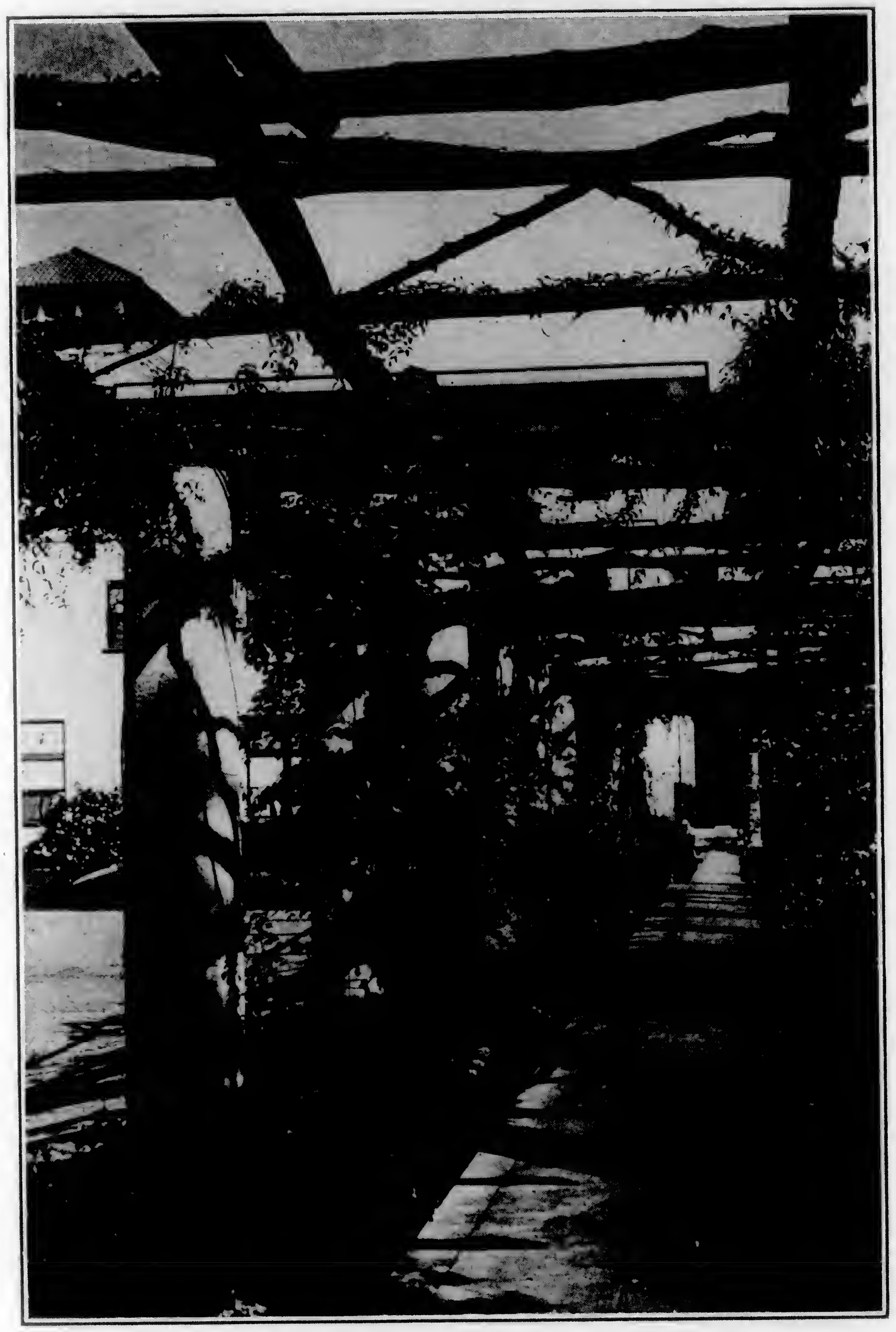
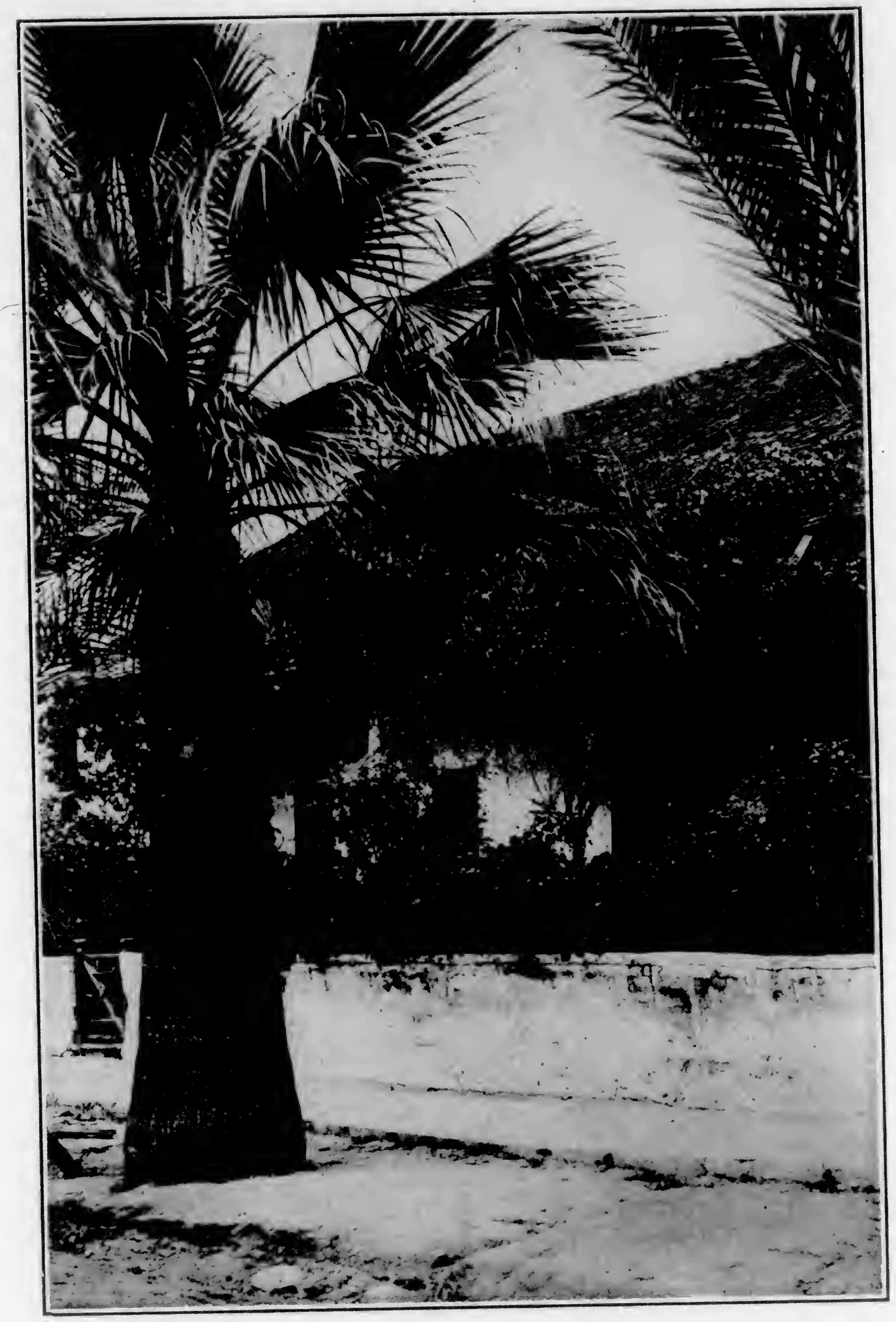


Pergola of the Hotel Maryland at Pasadena

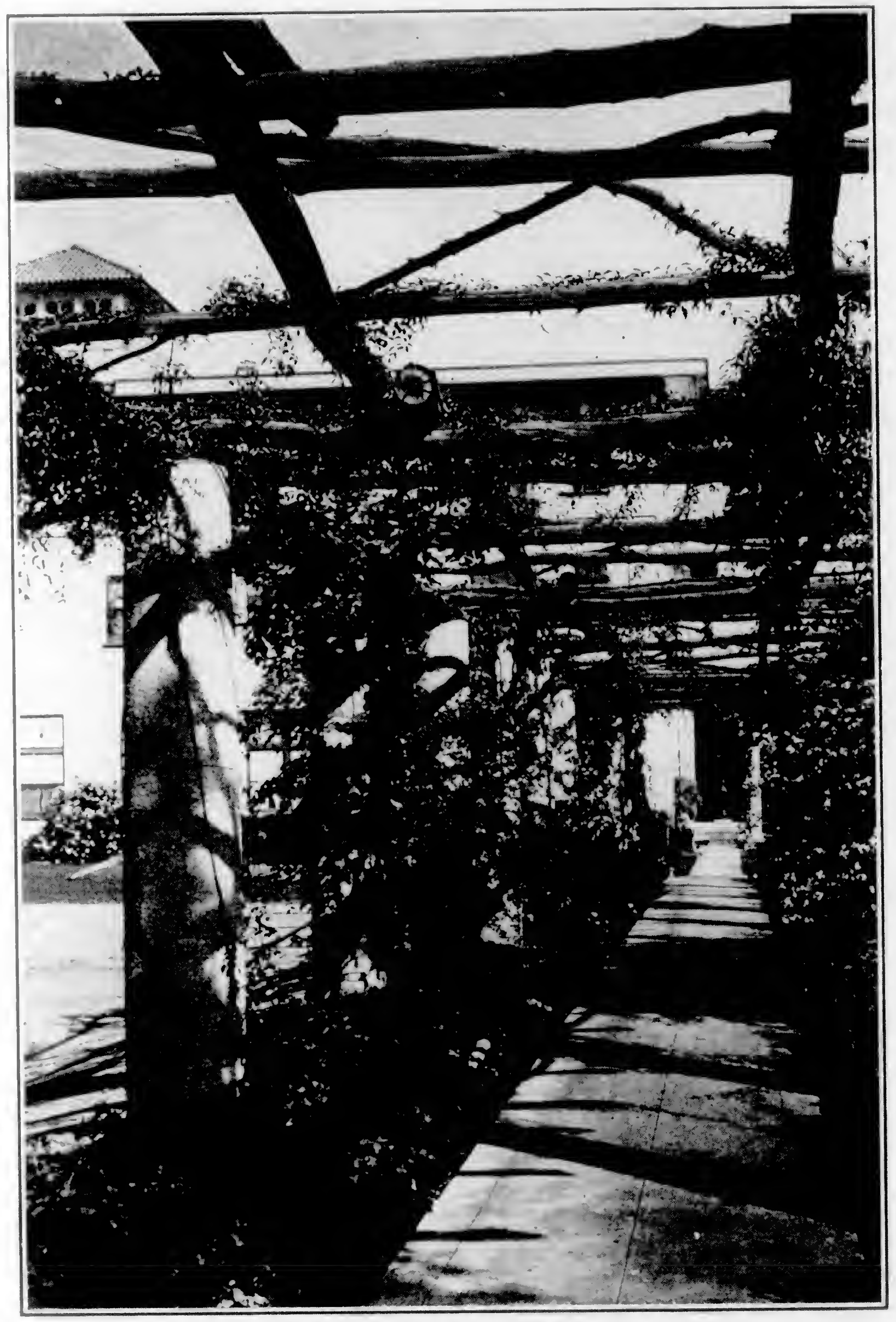
to turn the carpenter into a cheap substitute for the stone-cutter. It so happened that the easiest and most economical way to build happened to make a tolerably pleasing building, and by the same happy chance, even the barns, thrown together as they were in the hastiest flimsiest way, frequently had a good curve or angle to their big roofs, and a certain symmetry in the arrangement of their fronts. One need not be surprised consequently, to find people of taste occasionally converting these old ranch buildings into eligible country houses, and the enclosed yards with



The Priest's Home, San Gabriel Mission
An Example of the Adobe House

which they were generally accompanied into semi-formal flower gardens—as has been done in one notable instance in the vicinity of Carmel.

Some years elapsed before many country houses were built in California for pleasure as well as for use. The country house as an architectural type implies a degree of economic maturity and social stability which California, in view of its early history was naturally slow to obtain; and even when Californians had settled down to the enjoyment of some



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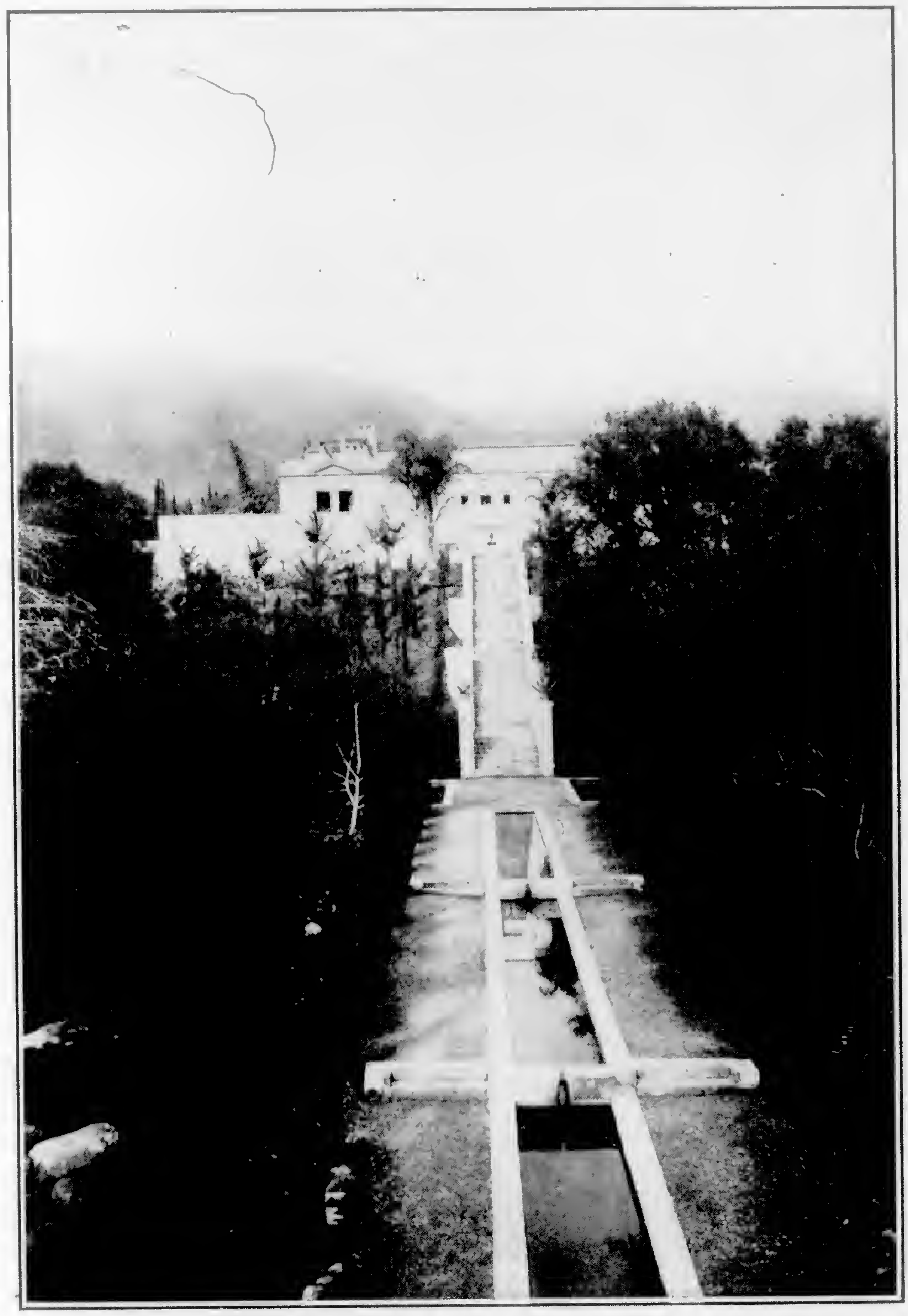

The Gillespie House, Santa Barbara. An Example of Formal Landscape Treatment
Cram, Goodhue and Ferguson, Architects

leisure and of the fruits of their prosperity, there were special reasons why a country house which involved some expense was less necessary to a San Franciscan than to a New Yorker. The climate of San Francisco, while it is pleasanter in some seasons than in others, is always mild, equable and invigorating, so that there was no season in which physical comfort demanded an escape to the country. At the same time when the San Franciscan did desire an escape to the country, he was under no similar compulsion to build a country house. The rainless summer and his proximity to the Sierra made a camp in the mountains, the pleasantest

and the cheapest way of enjoying country life; and to the majority of Californians camping was as familiar as it was enjoyable. Their early life had accustomed them to it, and even when they had a roof over their heads and plenty of money in their pockets, they returned to the open sky and a shake-down at night without that sense of awkward unfamiliarity which diminishes the pleasure of many campers in the Eastern woods. The truth is that the inhabitants of such a country as California blessed with so rare a climate, had no need to make as sharp a distinction between indoors and out of doors as do the residents of a land possessed of a wet and rigorous climate.

Californians enjoy their country more naturally and more innocently than do the inhabitants of any other state in the Union; and this attitude of theirs toward country life will undoubtedly have an important effect upon the design of their country houses. For no matter how popular and enjoyable camping might be, the country house was bound to come. Neither the inexpensive freedom of a camp in the mountains, nor the comparative acceptability of city life in the summer could prevent a civilized people from seeking some of the more elaborate and expensive, but no less valuable interests and pleasures of country life—such interests, for instance, as the building of big country houses, the raising of fine stock, the cultivation of flowers, and the enjoyment of rural sports. These are pleasures, which even a camp in the mountains cannot give; and yet they are pleasures which every intelligent and sympathetic people, possessing leisure and money enough must come to demand.

In response to this demand Californians have of late years been building country houses of all sorts and conditions. Comparatively poor people have been taking advantage of the increased accessibility of the outskirts of the larger cities to erect suburban houses in which one can detect at least an aspiration toward the country. People with somewhat more money and leisure are selecting some favored location by the seashore or in the mountains, and there building shacks or bungalows, in which the aspiration toward the country is more completely realized. And finally in the vicinity of the larger cities the rich are making country places which are intended to afford an opportunity for the most elaborate and expensive pleasures of country life. Each of these different grades of house has some interesting local traits.

The suburban house, erected in the vicinity of San Francisco and Los Angeles only too often resembles the three-story Queen Anne cottage erected in the East, which has no virtue, either practical or aesthetic, except that of being cheap; but fortunately there are many of these suburban houses which do not conform to the popular but depraved Eastern type. On the contrary, they remind one of the lines and proportions of the ranch houses which I have already described; and in this respect they perpetuate the best available tradition. They tend to be one or two-story buildings, with long low lines, and with the roof over-hanging and dominating the upright members. The piazza, which was so necessary to the farmer in the interior valley is generally dropped, and an enclosed porch substituted in its place, so that the rooms of the house will receive the grateful sunshine. Thus they are frequently very respectable little buildings in spite of the flimsy way in which they are constructed; and let us trust that this sort of house will gain in popularity compared to the formless "Queen Anne" cottage with its affectation of picturesqueness and its general air of commonplace impropriety. In the East where large cellars and deep foundations are necessary even in cheap houses, the

The Gillespie House, Santa Barbara. An Example of Formal Landscape Treatment
Cram, Goodhue and Ferguson, Architects

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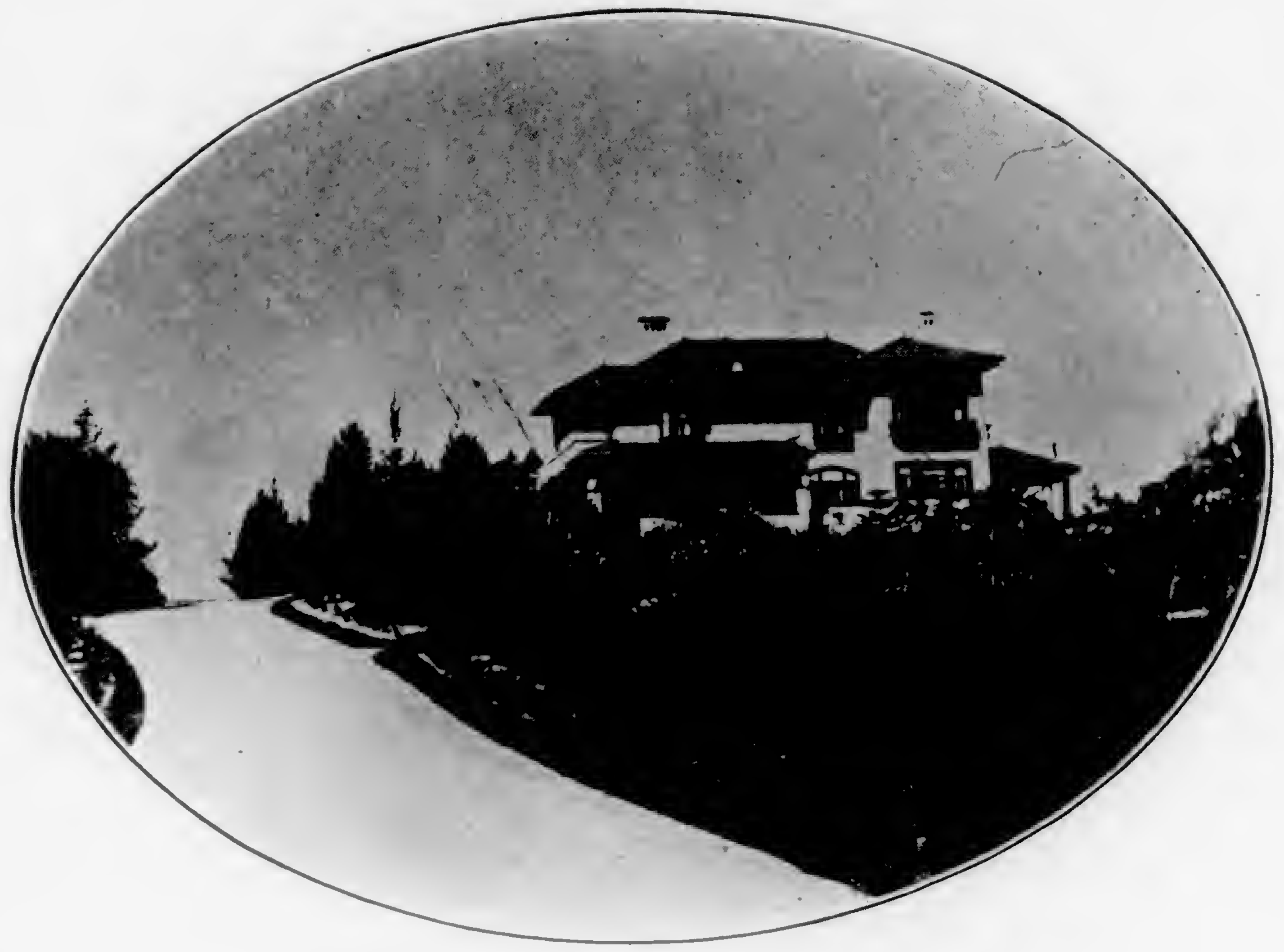
"Queen Anne" cottage has at least the merit of being less expensive than lower and better proportioned buildings; but in California it fails to have even that humble virtue. There is no economy in cocking up in the air a house, which usually lacks anything worth the name of a cellar and foundations. On the contrary, the lower building, which fits tight upon the ground may well be cheaper to construct; and in the interest of good simple architecture, it can be as cheap and flimsy as it pleases, provided only it perpetuates the better tradition. The influence of a good tradition is in such cases all the more important, because these little houses are never really designed. They are merely duplicated by the thousands like pairs of shoes; and their only salvation hangs upon their bondage to some decent model.

The small suburban house shades off by imperceptible degrees on the one hand, into the bungalow, and on the other hand, into the larger suburban house; and these types of residence are to be distinguished from the one already described, because they are as a rule consciously intended to look pleasing. The bungalows are indeed, generally such very cheap little buildings that no architect's fee can enter into the cost of their construction; but they are none the less houses which are built as much for pleasure as for use, and the owner or his wife almost always has certain aesthetic ideas which the house must satisfy. Fortunately these ideas are for the most part good; and the bungalow usually tends to be a picturesque variation on the type of the small suburban house. If the builder goes astray, it is generally because he becomes over-conscious of the fact that he is designing a house in the country. He frequently tries to obliterate as much as he can, and more than he should, the necessary difference between the form of his house, and the form of features of the landscape; and in this way he falls into what is, from the point of view of sane architecture, a meaningless affectation of rusticity. More often, however, these little bungalows are characterized by a simple and unaffected propriety both of design and in the use of materials, which to an Eastern visitor is both novel and highly pleasing. They are worth careful attention because during the next few decades they will undoubtedly increase prodigiously in numbers. They are admirably adapted to the Californian climate; they are within the means of all but actually poor and overworked people; and there are an inexhaustible number of charming spots, both on the sea-coast and in the hills and mountains, which are sufficiently accessible from the larger cities to invite their erection. Finally they possess in a high degree that informal and provisional character, which the majority of Californians continue to prefer, and which is the result of the comparative newness of their economic and social life.

We must turn, however, to the suburban houses which are costly enough to have been designed by architects in order to find how good (and how bad) such wooden buildings in California may be. It is unfortunately true that, on the average, houses of this class are less acceptable than their cheaper neighbors. They may not be, as a rule, any worse than the majority of summer houses erected in the East and the Middle West; but they are more disappointing, because one's eye in California is keyed up to crave and almost to expect something more appropriate and entertaining. If, however, the majority of the more expensive frame houses are unworthy, there is a minority of the elect, which constitute some kind of a compensation. These buildings must be classed among the very best attempts which have been made in this country to give a wooden frame building a characteristic form and texture. Our wooden houses have been for the most part cursed by the fact that both owner and architect have been ashamed of their chosen material and were trying to constitute wood as in one way or another a substitute for stone; and it is peculiarly refreshing consequently to find, as we do in California, evidence of a very general desire, to use wood in some more idiomatic and appropriate way. The native Californian redwood is a timber with admirable qualities both for structural and ornamental purposes; and it is fortunate that a group of architects are coming to the front, who are prepared to do it justice. Maybeck, Mathews, Howard, Day and others in San Francisco; and Myron Hunt, Elmer Grey, Arthur Benton, and Greene & Greene in the vicinity of Los Angeles are all designing houses which are picturesque without being affected, and free and bold without in general being freakish and bizarre. Their work gives one the sense, so rare in this country, of being at once freely and vigorously imagined and carefully composed.



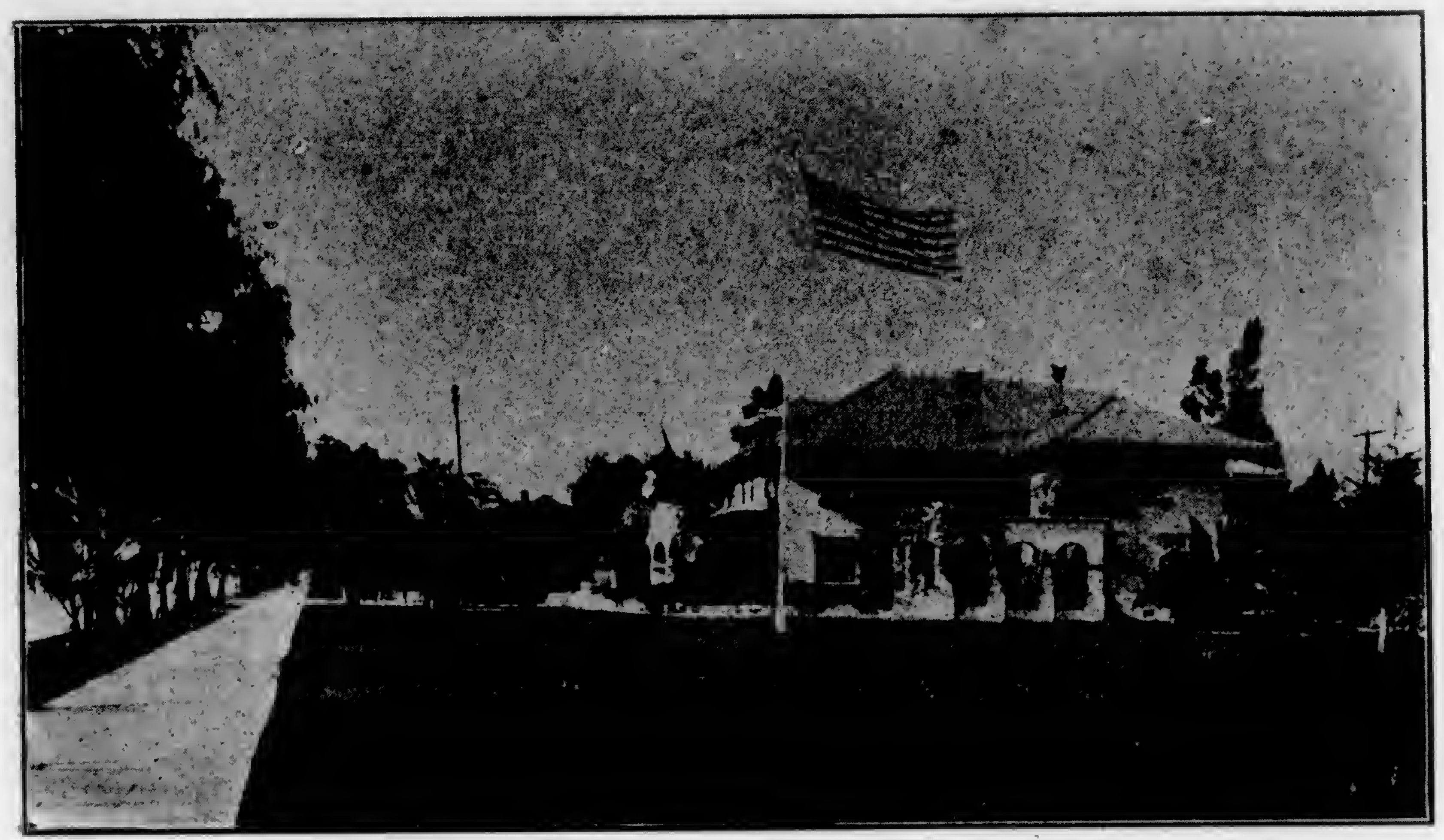
Residence of the Rev. Robert J. Burdett, Pasadena

Our countrymen, however, have given unmistakable indications that they can not be satisfied with country houses, which are either provisional and informal or suburban. As their means increase they have sought to make the country house as an architectural type more and more complete and elaborate; and this has meant the substitution of more permanent materials for wood, and the attempt to surround the house with grounds which are laid out and planted for the purpose of bringing out architectural values. All over the country, but particularly in the vicinity of New York, the richer Americans have been rearing country houses which were comparable in scale and magnificence with the historic country places of Europe; and if the attempt has not been wholly successful it is not because money has been spared. One can find certain traces of this ambition in California. In the vicinity of San Francisco, Los Angeles and Santa Barbara country houses have been built, surrounded by

Residence of Mr. L. V. Harkness

abundant grounds, which are intended to be something more than informal and suburban. The intention has not been as fully realized as it might, because wealth has not been accumulated in California so largely as it has in the East; but its completer realization is obviously only a question of time. Indeed one may safely prophesy that California, more than any other state in the Union, will little by little become the land of great country estates, because not only will the well-to-do Californians themselves seek more permanent and elaborate houses, but the New York and the Chicago millionaires will frequently covet a fitting residence in California—just as an English duke or a German prince has his villa on the Riviera. The Californian countryside is assuredly destined to become something more than a granary and a fruit-garden for its permanent residents, and a health resort for birds of passage. Certain favored parts of it are also manifestly destined to be an ornamental garden for Americans, both from within and without the State, who want and can afford the most elaborate and highly wrought pleasures of country life.

It is the design of these large houses in particular which needs to be influenced by a single good and appropriate style. The larger houses already erected at Burlingame and elsewhere have a great deal of interest, not so much because of their architectural design, as because of the example they afford of how much Californian vegetation can do in a short time for Californian landscape architecture; but their appearance does not betray any sufficiently definite appreciation of the fact that the nature of the Californian landscape calls for a certain kind of house. As was remarked heretofore, the designs of these larger houses are derived from sources as miscellaneous as those which are erected in the much more radically diversified climate and countryside of the East; and it is of the utmost importance now when the practice of landscape architecture is only beginning that the most appropriate style should be selected and should come to have a certain authority. Consequently, in order to justify the claim that the landscape *does* call for the one sort of house rather than another, I must briefly consider what the character is of the typical California landscape.



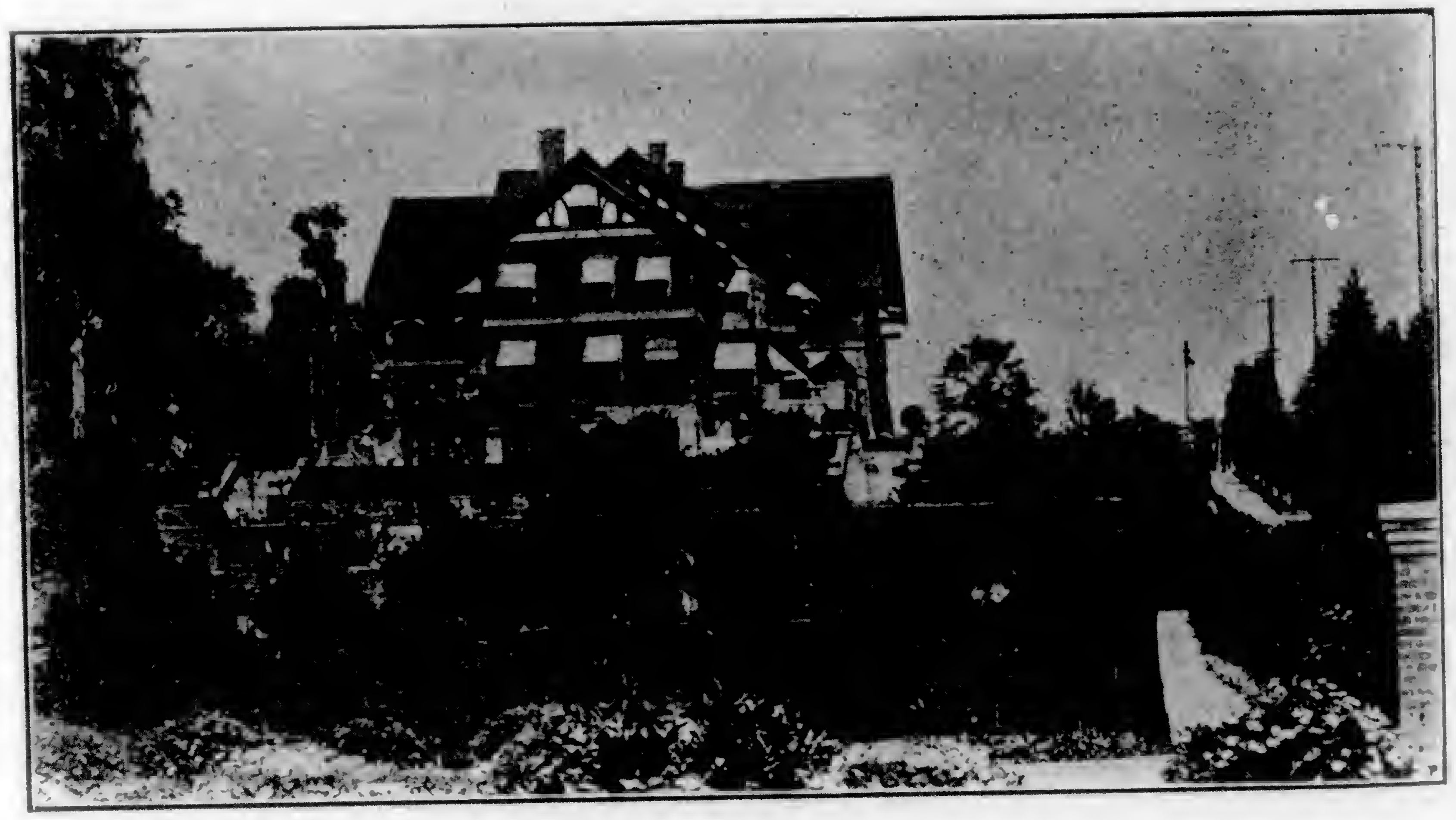
Mr. Frank C. Holder's Home

The many beguiling aspects of the Californian country have been sufficiently described and admired; but so far as I know the hillsides near the coast have never received the tribute they deserve merely as a consummate opportunity for formal landscape architecture. I limit this tribute to the hillsides near the coast, because the slopes of the Sierra and the plains of the interior valleys, whatever their other advantages, do not possess any peculiar affinity for one kind of country place. The steep wooded slopes and the far-reaching perspectives of the mountains are adapted to the temporary shelter and the primitive occupations of the camper rather than to the artifical and complicated needs of the "country gentleman," while the hot summers and the broad level stretches of the San Joaquin and Sacramento valleys, much as they benefit the farmer, will hardly tempt people, who are economically independent in their choice of a country residence. But almost all along the coast, and on both sides of the coast range, the ordinary countryside is from every point of view consummately adapted to complete human habitation. There is scarcely any need to search for peculiarly beautiful and appropriate sites, although, of course, some spots will necessarily be comelier and more convenient than others. The landscape in its most familiar characters of scale, contour, distance and vegetation appears almost to have been fashioned for the purpose of providing a fitting background for a rural architecture which has been informed by the classic spirit.

The peculiar propriety and beauty of such a landscape escapes the attention of many Americans, because admiration of the spectacular and picturesque in nature has become with us almost an aesthetic tradition. Many of the early American painters fostered it; and it has been encouraged by the fact that the peculiar impressiveness of the general American landscape as compared with that of Europe, depended upon its wildness and its grandeur—that is upon its general spectacular and picturesque qualities. Consequently when the American comes to build a country house, he has a tendency to seek the highest hill and the largest view in the chosen neighborhood.

California Home of Mr. Adolphus Busch, Pasadena

This propensity has not had a very happy effect upon American landscape architecture. The high hill and the sweeping view are all very well in their way; but they rarely provide a congruous setting for a house or a favorable opportunity for a convenient and attractive layout of the grounds and the garden. The country house needs a landscape which is smaller in scale, and in which our architectural contrivances are not made insignificant by the scale of their surroundings; and such is the character of the coast country in California. Of course it has its moments of grandeur and picturesqueness, but in its more familiar aspects this landscape is to be characterized rather as simple, sweet, quiet and distinguished. It is as far from being merely soft and pretty on the one hand, as it is on the other from being wild and spectacular. It may consist of no more than a line of low bare hills whose deeply modeled slopes and round full contours relieve the monotony of a fertile plain. Or the whole country may be broken into a succession of hills and valleys, none of which are ragged, abrupt and precipitous, but whose whole layout is tied together by bold yet gentle lines and surfaces, and separated by a multiplicity of levels, aspects, exposures and views. There is nothing either episodic and startling or vague and miscellaneous about such a countryside. The uplands are high enough to be effective, and the lowlands broad enough to furnish perspectives and approaches. This affords in acceptable proportions both foreground and distance, privacy and space, fullness of sunshine and depth of shadow. It is a landscape which not only would not be spoiled by the stamp of intelligent human habitation but which would be as much improved by appropriate houses, properly planted, as a clipper is improved by its sails or a bush by its flower. It really needs the enhancement of value, which may be derived from the evidences of human care and interest, and it welcomes some subordination to the practical and aesthetic requirements of civilized human residence.



Residence of Mrs. George W. Childs

In case these hillsides and valleys were well wooded, one could hardly say that they actually needed the enhancement of appropriate landscape architecture. It is the fact that they are as a rule almost if not entirely bare of large vegetation which helps to give the landscape architect such an incomparable opportunity and which enables him at once to serve his client and to bestow a higher aesthetic value upon the countryside. He does not even have to destroy one value in order to create another, as he might in case the country were well-wooded. He merely has to add to the country the sense that it is not only latently human, but actually humanized by the habitation of cultivated and appreciative people; and in this task of properly settling his houses and roads upon the countryside, he can call upon resources in the way of available planting as rare and as complete as the character of the landscape itself. Not only will anything and everything grow upon these hills, provided the water supply is sufficient, but the trees and shrubs which grow most easily and which are today most familiar are generally most useful. The landscape gardener has at the outset the great advantage of being able to dispense almost entirely with deciduous plants; and in as much as out-door life is to be enjoyed both winter and summer, he should use this advantage just as far as he can. Among these available evergreens, the live-oak is easily the king. One can scarcely be too enthusiastic about this tree, which nature seems to have allowed to grow wild on the hillsides, so as to provide a perfect foliage with which to surround the houses of men. No other evergreen has anything like as high a value in immediate relation to a house and garden, unless it be its relative, the Italian ilex, and in the cooler summers of the Californian coast-country the spreading foliage of the live-oak, which allows the desirable sunlight to filter through, is both more useful and more beautiful than that of the impenterable ilex. And if the common live-oak is precisely adapted to supply certain of the foliage which may be desirable in the immediate vicinity of a house and garden, the equally common eucalyptus serves quite as well for use along the lines of roads or in general for planting in many places at a greater distance from the house and garden, in which high masses of dark foliage may be effective But I have no room to specify further. The many varieties of acacia, the olive, the Monterey and Italian cypress, certain peculiar, novel and adaptable kinds of pine, the ordinary amanzunta and lupin, all of these plants and many hundreds of others, which possess an almost equally distinctive value, offer themselves for ornamental planting in relation to the California country house and garden; and if they are used discreetly, and in subordination to the architectural scheme, the roads, terraces, walls and buildings so far from marring the landscape, will merely add to it a human confirmation.

Rare and highly distinguished as the Californian countryside is, it would be a great mistake to assume that its high distinction demands a peculiarly Californian type of building. Doubtless any traditional type of residence which came to prevail would have to be modified in certain respects, in order to adapt it to the peculiarities of the climate and of the life of the inhabitants. Nevertheless Californians should never forget that the distinction of their landscape consists in its possession to an extraordinary degree of some ordinary qualities. It is a consummate example of certain characteristics in a countryside which have in the past proved to be most permanently satisfactory to people, who combined elaborate and cultivated tastes with the love of nature. The better domestic architecture whether of Italy, France or England has rarely been situated in a picturesque and rugged country. It is almost always to be found in a landscape, similar to that described above, only as a rule rather less complete and adaptable. The Californian countryside, while neither English, French nor even Italian, is something better than any of these. It is normal. It is temperate. It is well-balanced. It is classic. Like all classic and normal things, it makes its effect by a mixture of daring and discretion, and is as free from timidity on the one hand as it is on the other from excess. The architectural and horticultural embellishment which it receives should partake of the same character. It should seek effects, which are both simple and vivacious, but whose simplicity is not obtained by reticence and elimination, and whose vivacity is neither disorderly nor bizarre. Its simplicity, therefore, is precisely equivalent to a triumphant mastery of all elements, either natural or architectural, which contributes to the total effect. Its architecture should not mutilate the natural grace of the countryside in the interest of some stiff and rigid scheme; but neither should it fear to impose an appropriate architectural scheme upon the round contours of the hills. It should not try to imitate natural effects in its lay-out and planting nor should it seek to sear the landscape with lines which ignore and disregard such natural effects. Just as it is the part of good manners to be polite and cordial without being stiff and insincere, so it is the part of good landscape architecture to be formal and self-possessed without being unnatural and prim. In the absence of some such intimate and successful combination between the artificial, practical, and aesthetic needs of men and the artless irregularity and diversity of nature, the architecture of a country house and its grounds cannot possess any classic propriety of form.

Such being the architectural needs of the Californian landscape, it is peculiarly fortunate that California possesses historical associations with the most complete embodiment of the classic spirit in domestic architecture, viz., with the Italian villa and garden. Of course the association is not direct and the type must be modified very much in the transfer; but the allegiance and the obligation are unmistakable. The Spanish dwelling from which the adobe house was descended, is as I have said, a picturesque version of the Italian convention in the design of residence; and what the Californian landscape needs is a modification along somewhat

Pergola, Mr. Chester Bailey Fernald's Home

more picturesque lines of the Italian villa and its surrounding architectural and horticultural treatment. But in trying to describe in general what these buildings may look like, it would be a mistake either to go too much into detail or to keep any specific Italian villas too much in mind. Any general type of house, which is recommended as specially appropriate, must be capable of the widest variations, so as to suit the many different determining conditions of site, exposure, natural planting, convenient ways of approach, and possible cost. It is much more important to insist upon the essential ideas which ought to shape the design and planting of these houses than to attempt to describe very much in detail their characteristics.

The design of every country house, which is a matter of serious architectural consideration, should be approached from two points of view —the point of view of how the house will look in relation to the landscape, and how the important features of the landscape will look when seen from the house and in relation to the necessarily artifical arrangement of its grounds. In the case of the country house in California, the first of these points of view is of more than usual importance. The coast country con-

The Cochran House, Los Angeles. Myron Hunt and Elmer Grey, Architects

sists throughout of small hills and valleys, and the tops of these hills will naturally be generally chosen as the sites for dwellings. In such situations these houses will be conspicuous features in the landscape. They should be designed so that they will neither be out of place on their hills, nor merged inconspicuously into them and the surrounding trees. They should consequently be buildings which are long in proportion to their height, because a house which is cocked up in the air, does not look well on a hill, and because the live-oaks in the vicinity, are not big enough in scale to provide a proper background for a tallish building. The walls of these houses should be light in color, because a very positive color is the best means of emphasizing a building, which is both conspicuous and is surrounded by trees, and because white or light grey houses look well in the brilliant Californian sunshine. It should have a gently sloping roof, but one which is broken in outline, large in surface, gay in color, and emphatic in the shadow which is cast by its eaves. A building in the foregoing type would resemble in some respects an Italian villa; but it would have many characteristics which depended upon local conditions. It would be a more picturesque building than the Italian villa usually is, because the American taste for the picturesque is too strong to be entirely disregarded. Its walls would be pierced by many more openings, because the sunlight is grateful and necessary even in California, and because the plan of a modern American house demands a large number of rooms and consequently of windows. Then, again, the amount of ornamental detail to which one is accustomed in Italy, might well be reduced on these houses, because in our country such detail costs more than it is worth. Sculptured ornament there will be of course, but the architect should depend for his effect upon the masses and the color of his building, and the shadows it casts, and its plainness should be relieved chiefly by trees, shrubbery and vines.

When we come, however, to consider the house, not from the point of view of its place in the landscape, but as a means of introducing its inhabitants to the countryside and there amusing them, we reach a very different set of requirements. The house must not merely hold its own in the landscape without becoming an excrescence; but it must be planned in relation to its surroundings so as completely to satisfy the complicated, practical and aesthetic needs of its inhabitants. Such is the meaning and the purpose of formal landscape architecture and gardening. The formal treatment of a country place does not consist, as many people seem to imagine, in laying out straight roads and paths irrespective almost of the nature of the ground, and then outlining or terminating them with walls and pergolas. It consists first in laying out the roads, approaches and buildings connected with the estate, so that convenience will not interfere with good looks. It consists secondly in effectively outlining and emphasizing the most beautiful landscape views, which are accessible in the immediate vicinity of the house and in shutting off those which are not beautiful. It consists finally, should a flower garden be wanted, in giving that garden a size, a layout and a frame, which is adapted to its situation and its necessary natural and architectural surroundings.

The difference between a formal and an informal treatment of a country place lies not so much in a difference of purpose as in a difference in method. An informal treatment would seek the same objects; but in doing so it would eschew so far as possible straight lines and architectural features. It has a theory that straight lines and architectural frames and features are unnatural; whereas as a matter of fact they are no more unnatural than is the house itself, or any other evidence of civilized life in the country. They are artificial; but given the proper surroundings they can be made entirely appropriate. Straight lines are necessary, because a straight line is the shortest distance between two points and because the eyes of men cannot see around a curve; and landscape architecture is necessary, because only by such means can the necessary vistas be filled, and the desirable definition and lineature given to the landscape. But all these architectural features can be and should be relieved of their rigidity by an abundance of appropriate planting. It is, by virtue of the trees, shrubs and vines that the architecture takes its place in the natural surroundings; but it only does so on condition that the planting is planned so as either to soften an architectural line or to complete an architectural effect The average American idea of planting in the vicinity of a country house is to put a shrub which they like in the ground, wherever it will grow; but in any formal scheme the planting must be subordinated to the general effect. At one point foliage of a certain color, density and mass is required; at another point foliage that is smaller in mass and more dense in its habit of growth. And the same principle must be extended to the planting of the garden. The flower garden is not merely a place in which flowers are grown. It is a place, in which the flowers which are grown are seen to the best advantage. I suggest this idea of the house and garden which is adapted to the coast country of California, because that country manifestly demands a certain kind of architectural treatment. Such methods of treatment may or may not come to prevail; but whatever authority the architectural profession can exercise in California should be used in their favor. So rare and perfect an opportunity exists nowhere else in the United States; and it remains to be seen whether Californians will have the good sense to use it discreetly. They will have every temptation to go astray, and to disfigure the landscape with an eruption of architectural and horticultural blotches, because it is a country in which almost any kind of house is practical and almost any kind of plant will grow. Nevertheless there are at least some reasons for believing that they will come to appreciate the desirability of treating such a simple, temperate and normal landscape in a simple, temperate and normal spirit. The Californians love their country without affectation and without effort; they possess a greater potency of successful achievements in the arts than do the inhabitants of any other single section of he Union; and best of all, they have shown an unusual power of co-operating either formally or informally to accomplish some purpose which is recognized to be good. They show an active and adaptable intelligence, that is, without being arbitrary and perverse in its exercise; and they may well reach some common sensible understanding about the sort of country house best adapted to their countryside.

Competitions in San Francisco

By W. GARDEN MITCHELL, Architect

AT THE present time conditions are too unstable and hurried for architectural competition, but the time will shortly arrive when they will be the order of the day. Many attempts have been made to regulate competition in such a manner as to assure the author of the best design having his plans accepted, but so far (talking, as I can, from experience in America and England), all such attempts to this end have been mostly unsatisfactory.

Two things have to be guarded against in all competitions. Dishonesty on the part of either the "owner" or the competitor, and inability on the part of the person or persons chosen to make the awards.

Without endeavoring in this article to recite the numerous pitfalls that lie in the way of architectural competition. Let us get to the matter directly by suggesting how an architectural competition should be conducted.

First of all, the more capable architects of this or any city should get together and determine on a set of rules and conditions and agree among themselves that they will not enter a competition unless these rules and conditions are adopted. This would mean to an intending builder that he would have only the inferior members of the profession competing if he would not agree to adopt certain simple and necessary conditions to insure a fair competition. It should be the duty of say the secretary of the local Chapter of the Institute of Architects, or other league of architects, to see that whenever a competition is proposed the party instituting the competition is informed in regard to the architects' agreement, and that a copy of the conditions be presented to him, and every endeavor made to persuade him of their reasonableness with a view to having them adopted, if not in their entirety, at least as far as possible; and should modifications be necessary, then such modifications to have the approval of the Architects' Institute or League.

Now to the conditions. Let us assume a building of some importance, say a theatre or church, to cost say a half a million.

I would propose that in the first instance the owners, in conjunction with two or more architects, meet for the purpose of endeavoring to formulate a clear idea of what they require, as to the capacity of the building, and its various adjuncts; the style of architecture preferred, if any, or considered most suitable; the cost; the materials to be used, and thus collaborating, give as much information as possible as to these requirements. Then advertise a preliminary competition in which all may enter; setting forth that the drawings are to be to some stated scale and to be drawn in pencil only. The competitor to determine how many drawings he considers necessary to illustrate his design. One perspective to be allowed. Plans and sections may be batched in pencil. Elevations to be in line only. Perspectives may be shaded. No color to be used in first competition, and the scale, I should say, not to exceed ⅛ inch to the foot. A competitor submitting designs not at all in accord with the stated requirements, but solving the problem in some better way, not to be disqualified, as some would think wise and just.

The object of the first competition should be largely to find out who are worthy to be considered seriously to enter the final competition, and also to help the owner to determine what he really requires and correct his instructions for the final competition.

Excess of cost should not disqualify a competitor in the preliminary competition, so long as he makes clear to the adjudicators that he is a capable and worthy contestant, but even in this competition it should be a condition that the cost must not exceed the sum stated by say 30 per cent. Then comes the consideration of the examining body who are to award the premium. Here, again, the architects of the city should have a list of jurors who are considered capable and willing to serve in this manner. They should, I think, in most cases be limited to architects only. For although there may be many good architectural critics outside the profession, it is difficult to be assured of such being familiar with planning and also on their guard against the trickery of drawings, to be thoroughly reliable as critics.

There should be three men on such a jury and the decision of two to be accepted, or in some cases one expert may be preferable.

This to apply to the preliminary as well as the final competition.

The three jurors to be paid a substantial fee for their services, say $400 to $500 each for the two awards. Then it is also desirable that the (six, let us say) architects placed highest in the first competition be paid something for their services, conditional upon their entering the final competition, say $500 each. These fees, it will be seen, raise the cost to the owner about three-quarter per cent, but it is fair to the competitors and should be the best spent money of the whole expenditure, as should be obvious to him if he would take time to think it out, for he stands to get in this manner a building worth 10 to 20 per cent, or even 50 per cent more in value.

The successful competitor should be assured of being employed to carry out the work at a stated commission; no friends or favorites to receive special consideration.

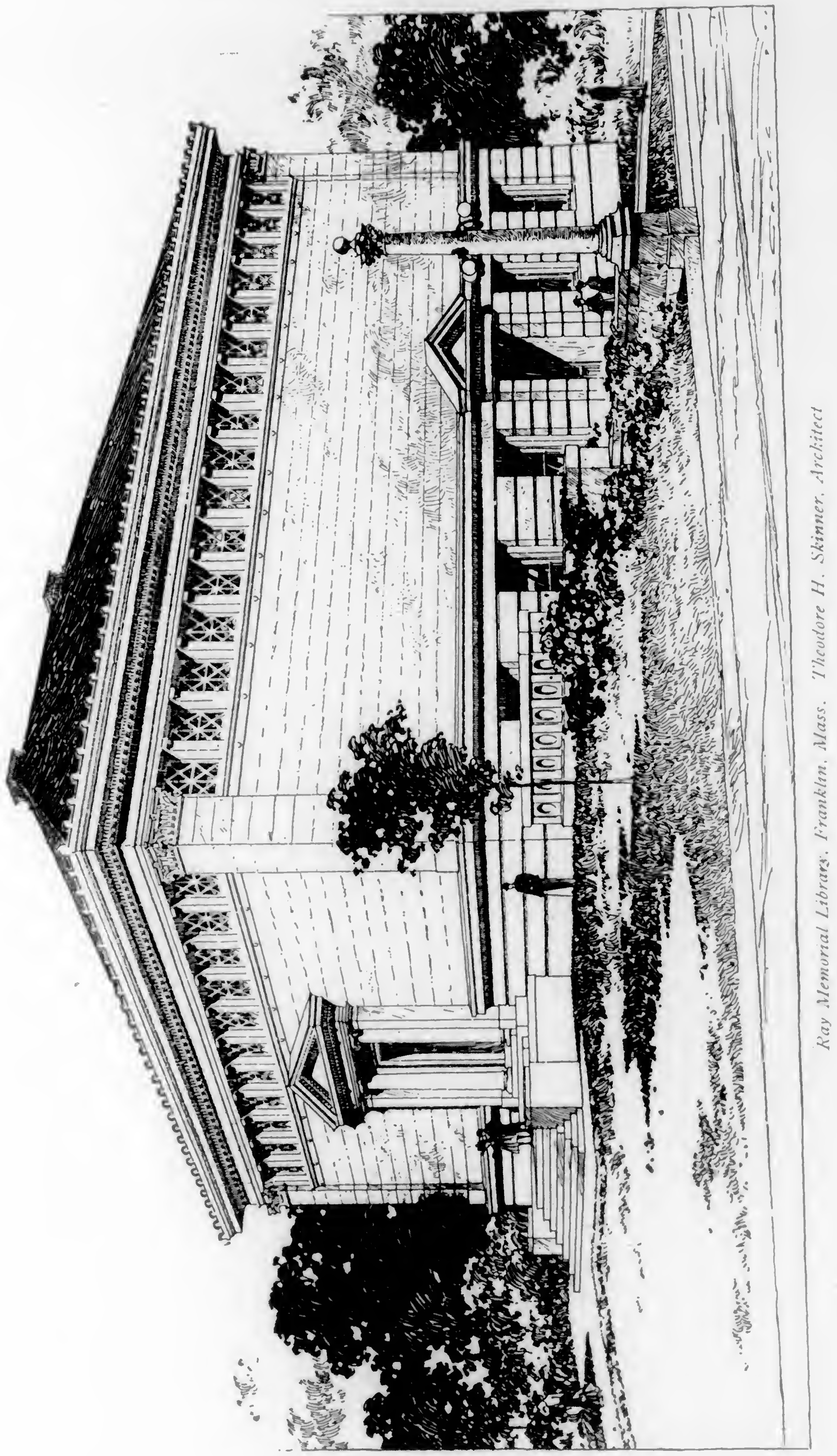
The names of the jurors should be set forth in the "conditions" and every endeavor should be made to induce these gentlemen to live up to their promise to act in this capacity. Architects are more interested in the jurors than in perhaps any other condition. Now as to the method of making the award.

The drawing having been duly marked with a number, the architects should proceed something in this manner: Writing down at the time their reason for counting out of the competition each set of drawings in turn, for example, drawings 10, 15, 22, 26, etc., not of sufficient architectural merit to receive any consideration; 14, 25, 28, etc., not good in plan and therefore not to be considered; 2, 5, 7, etc., good on plan, but unworthy in elevation; 3, 6, etc., good in plan and elevations, but excessive in cost, had to be disqualified. Nos. 18, 19, 20, everything considered, placed first in the order named.

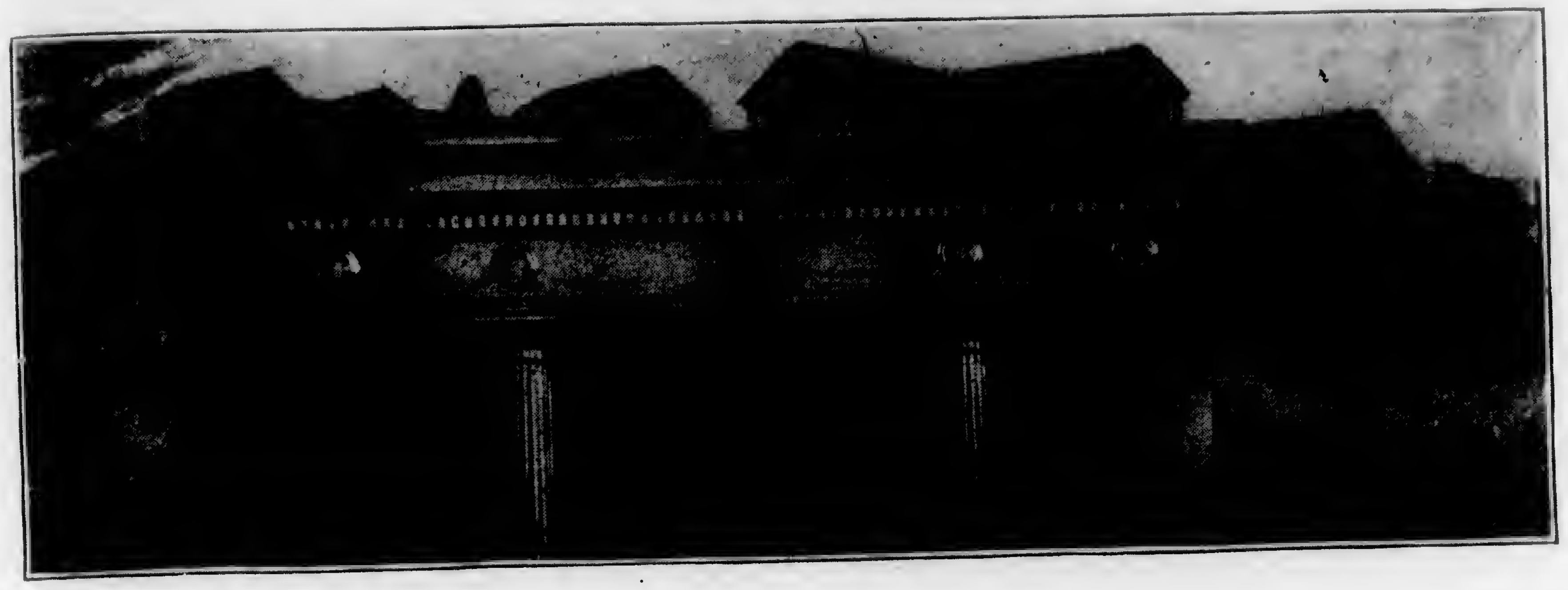
I recommend this method of procedure as I think it very unfair that a competitor should be kept in ignorance as to the reason of his failure, seeing that he gives so much of his time gratuitously to such competition. At the close of the competition a communication should be sent to each competitor informing him as to the reason of his drawing being disqualified. To receive the customary letter which usually runs in this manner: The committee begs to thank you, etc., etc., and to state that the drawings marked Ignoramus, or Genius (as the case may be), have been placed first. That is poor satisfaction. It is also a good plan to publicly exhibit the drawings. The winner never asks any questions, but if the owner wishes to get the best results he should see that he has a set of rules to be followed that will insure obvious justice.

* * *

"Look pleasant, please," said the photographer to his (more or less) fair sitter. Click! "It's all over ma'am; you may resume your natural expression."
—Cleveland Leader.



Ray Memorial Library, Franklin, Mass. Theodore H. Skinner, Architect



The Ray Memorial—An Unusual Library

By THEODORE H. SKINNER, Architect

THE architect called upon to supply plans for a library building to be built in a small town, whether by the library association, with its usually limited appropriation, or by some would-be benefactor, finds the problem not as easy of satisfactory solution as that presented by some larger and apparently more complex proposition. The building committee or the donor usually says, "We want a building, designed in some recognized style of architecture, built of some enduring material, that will look just as well one hundred years after it is finished as when first dedicated, a building looking well with only 5000 volumes on the shelves, but one capable of extension to care for perhaps 50,000 volumes, with ample reading rooms; waiting rooms; librarian's room, trustees' room, cataloguers', children's room, etc.; with possibly a lecture hall and exhibition room. We want embodied in the plans the very latest ideas on heating, ventilating and lighting, the newest wrinkles in the fittings of delivery desk, catalogue files, book stacks and cases; and all this we want for—well (say about one-quarter of what it will cost)—in short, they usually wish to embody in one small building all the good features they have seen in a lot of buildings they have been looking over, while considering their own proposition.

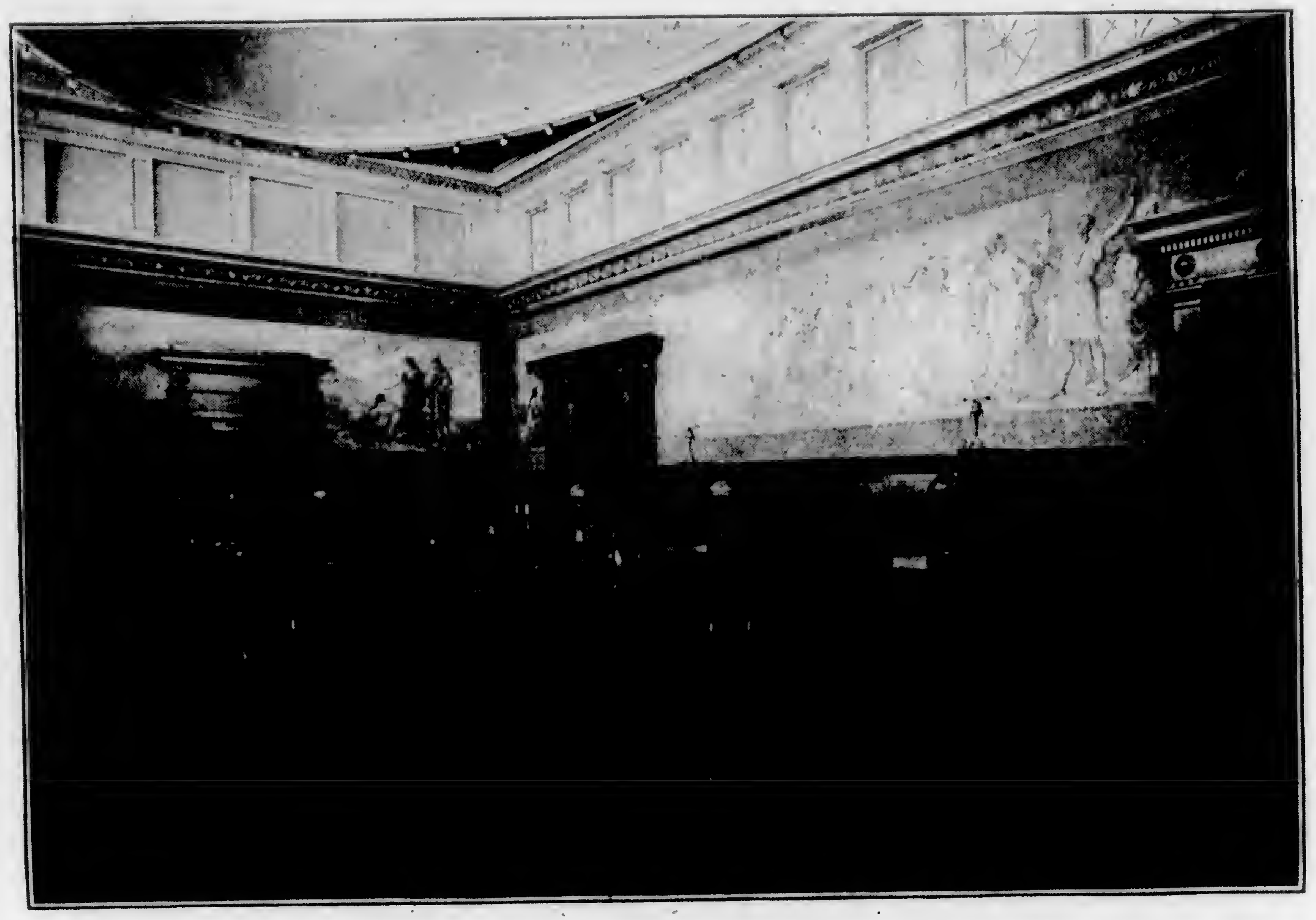
Sometimes, after competition, the committee selects a picture that would cost them to build a lot more money than they had to spend, and the picture is mutilated past recognition in execution. Sometimes they select an architect and say to him, "We want all this, but we know we cannot get it all for what we have in hand. You are expert, you know costs. Work at our problem with us, and tell us how much of our dream we can get; tell us what are the essentials, give them to us anyway, with such arrangement as best fits our needs, and with such proportions as may be at least dignified, and later decorated into beauty." With such a committee the architect is to blame if he does not go far and produce good results. Individual results, for different towns require varied treatments of the library problem, differently arranged interiors. A plan eminently satisfactory in one place, may be entirely unsuited to the requirements of another. Some towns are full of home-readers, others of library-readers. Some, as suburbs of large cities, are the homes of well educated people in comfortable circumstances, others are industrial or manufacturing centers peopled by laborers in mills, shops or mines, each demanding quite different library facilities to be of the most value to its constituents.

Corner of Hall, Ray Memorial Library, Theodore H. Skinner, Architect

It will be evident then from the foregoing that the first consideration in planning a library building, is "know the town" and its people. Thus only can the proportions of the whole which the various parts should occupy be determined. The rate of growth of the town and its library should be equal; knowledge of the one will determine whether the building must be planned so as to permit enlargement or not. Knowledge of the town, tells what time of day the library will be most freely patronized; whether by exchangers or readers, and whether it should be planned to give public access to the books, or whether they are to be secluded. This last point determines in a measure, regardless of the plan, the number of attendants and accommodations necessary to provide for their convenience.

The smaller the reading public, the simpler the plan of its library home should be—one compartment, in many instances, being all that is required, one side being reserved for the books, the other for readers, with an attendant's desk in the centre. From this simple arrangement with its direct control of the whole building, it is never necessary to depart in principle, even in the largest buildings, for it is always possible to keep the books on one side, and the public on another, of some central point of control, from which the director can be in easy touch with attendants on the one side and the public on the other, be the library ever so large.

Directness and simplicity in plan make for economy in maintenance, by reducing the number of attendants, and if all parts of stacks and reading rooms are visible from the central desk, readers can be allowed access to the



Reading Room Looking Toward the Entrance, Ray Memorial Library, Theodore H. Skinner, Architect

Reading Room, from the Entrance, Ray Memorial Library, Theodore H. Skinner, Architect

Corner of Hall, Ray Memorial Library, Theodore H. Skinner, Architect

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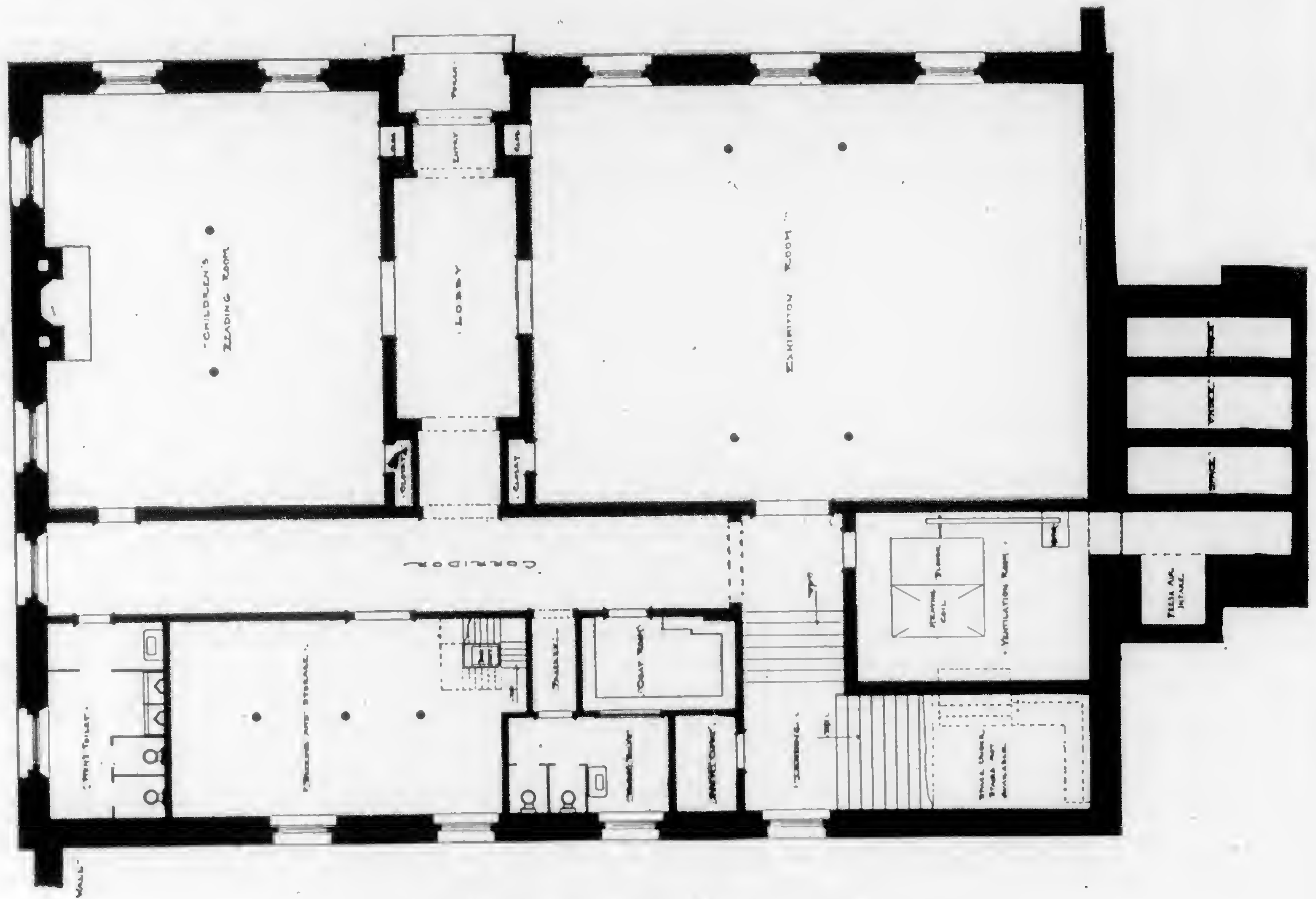
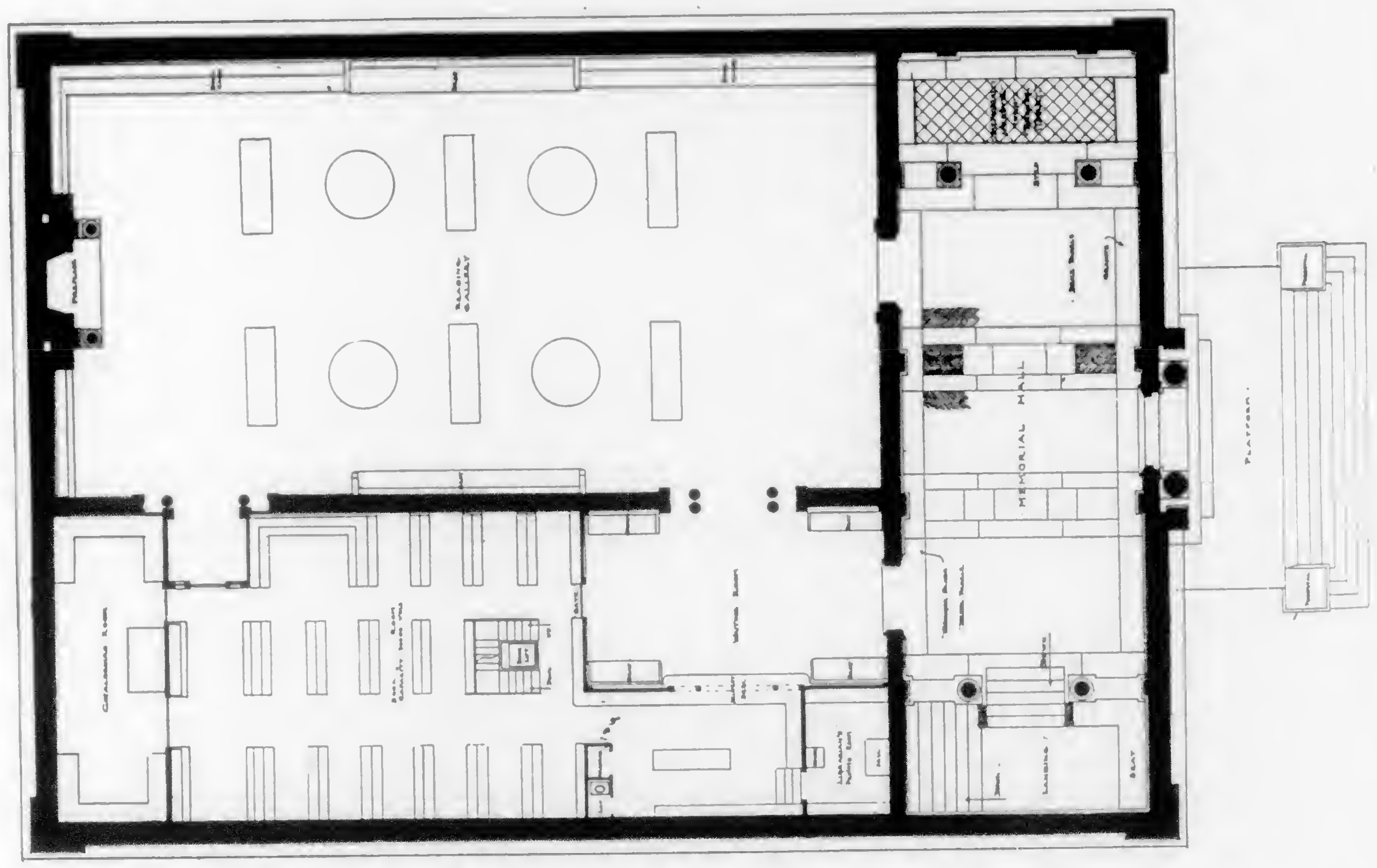


First Floor Plan, Ray Memorial Library



Second Floor Plan, Ray Memorial Library

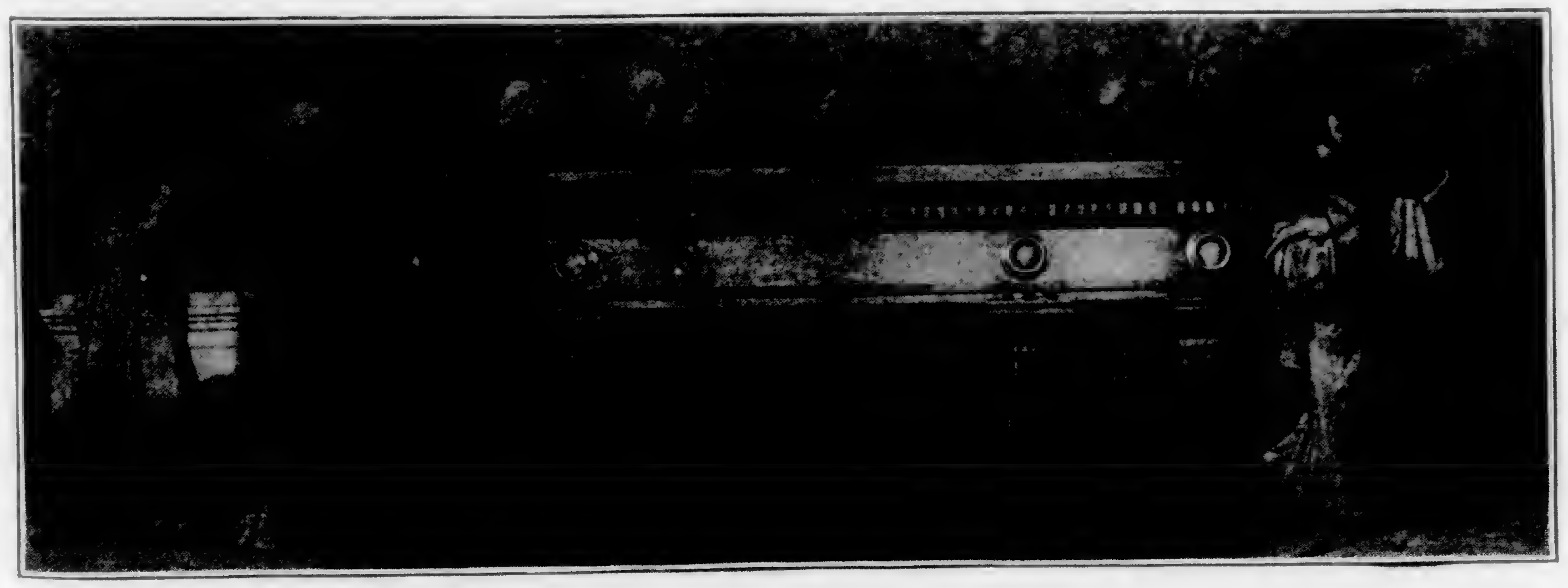
shelves and so half wait on themselves. I say half, as it is the invariable rule never to put back a book taken from the shelves.

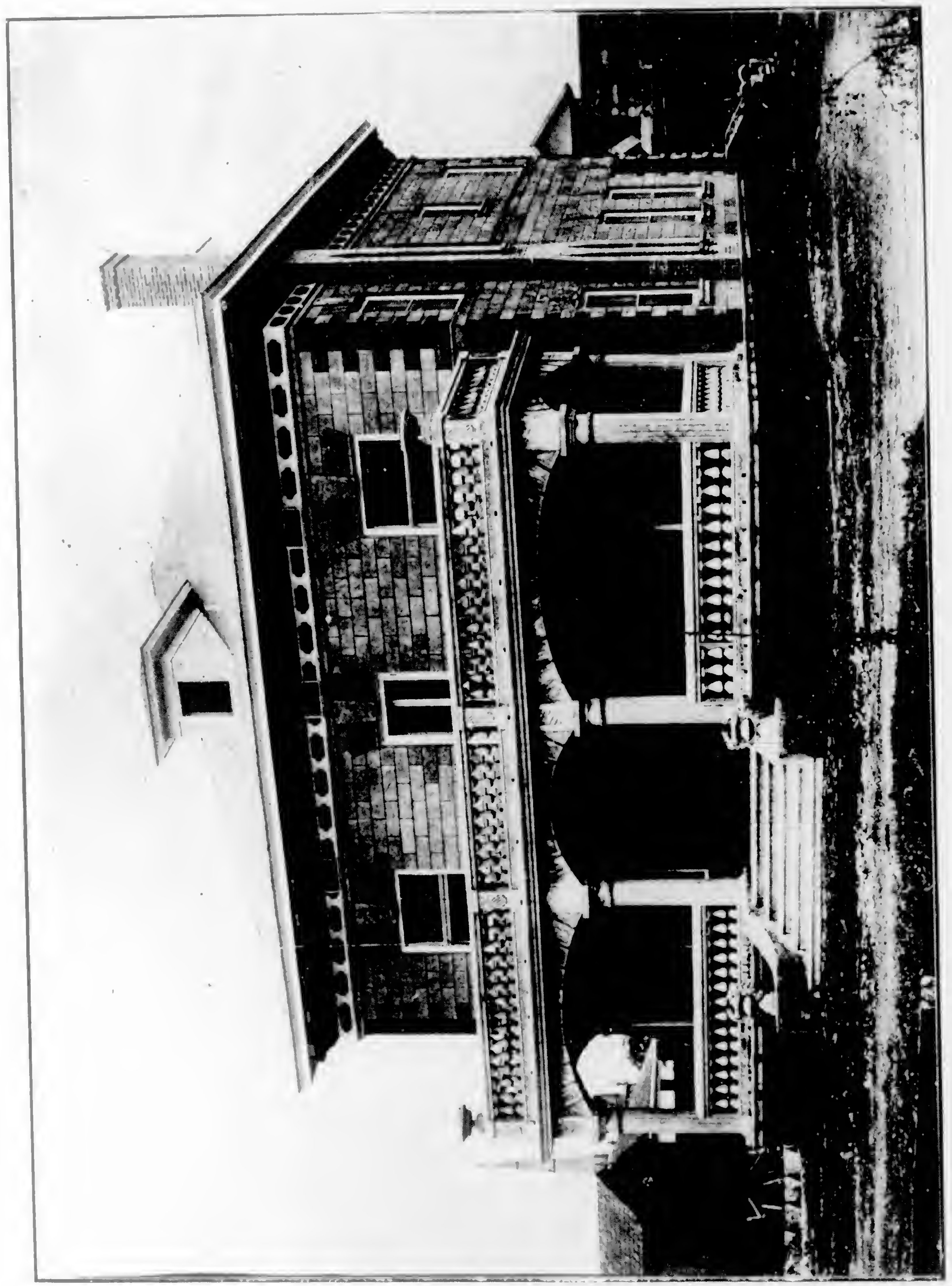
In planning the Ray Memorial for Franklin, Massachusetts, the author sought by simplicity to express the multiple purposes the building has to serve. The exterior by proportion and detail proclaims a public building; the large blank walls, interior decorations, memorial or historical; the continuous frieze of windows, a light and usable interior as well. The main floor contains only three divisions, "A" Memorial Hall; "B," Reading Gallery; "C," Book Room, so arranged that the attendant at the delivery desk in the book room can see any one entering or leaving by the main entrance in "A," or any one entering or leaving the Gallery from "A." This attendant also has control of the entrance and exit to the book stacks. "A," "B," and "C" are richly finished and furnished in marble and mahogany, and are decorated with large mural paintings. The book room "C" is arranged with storied stacks of steel and glass, dumb waiter, etc., with an ultimate capacity of about 50,000 volumes. Librarian's and cataloguer's alcoves are partitioned off from the free floor space.

The basement floor, reached from the first by a wide marble stairway, and also from the exterior on the side, through an entrance only a little less elegant than is that on Main street, is like the first floor divided into three divisions. "A," The Children's Room; "B," Lecture Hall and local history exhibition room; "C," The utilities of service. A broad corridor separating "A" from "B," also "A" and "B" from "C," leads from the side door to the foot of the stairway from Memorial Hall. The Children's Room and Lecture Hall are considered in this building, separate institutions from the library, and so are placed by themselves, removed from the control of the library attendant. They are neatly finished in natural woods and have special decorations in contemplation.

The exterior is of fine hammered granite, doors are of bronze, roof is of copper. The floors, vaults and domes of the interior are of Guastavino tile arch construction, finished with marble, tile, and monolithic floors, and rich ornamental cornices of cement plaster. Wood work is reduced to the minimum, except in the waiting room and reading gallery, where a free use of mahogany was made.

The decorations, considered by competent critics the finest in the United States, are the work of Signor Thomaso Juglaris of Turin, Italy, and Dr. H. H. Gallison, of Boston. The furniture, electric fixtures, picture frames, etc., are all special from designs made by the author. A complete system of heating and ventilating, using exhaust and pressure fans, with automatic regulation, a complete iron armored conduit electric wiring system, and the best of plumbing fixtures, serve to round out and make usable what is in many respects an unusual building. That it is unusual is the best excuse the author has for offering this description to his readers.





Residence of Mr. F. W. Osborn, Fresno. Built of Cement Blocks and Reinforced Concrete, by the Worswick Street Paving Company
E. Mathewson, Architect

A California Concrete Residence

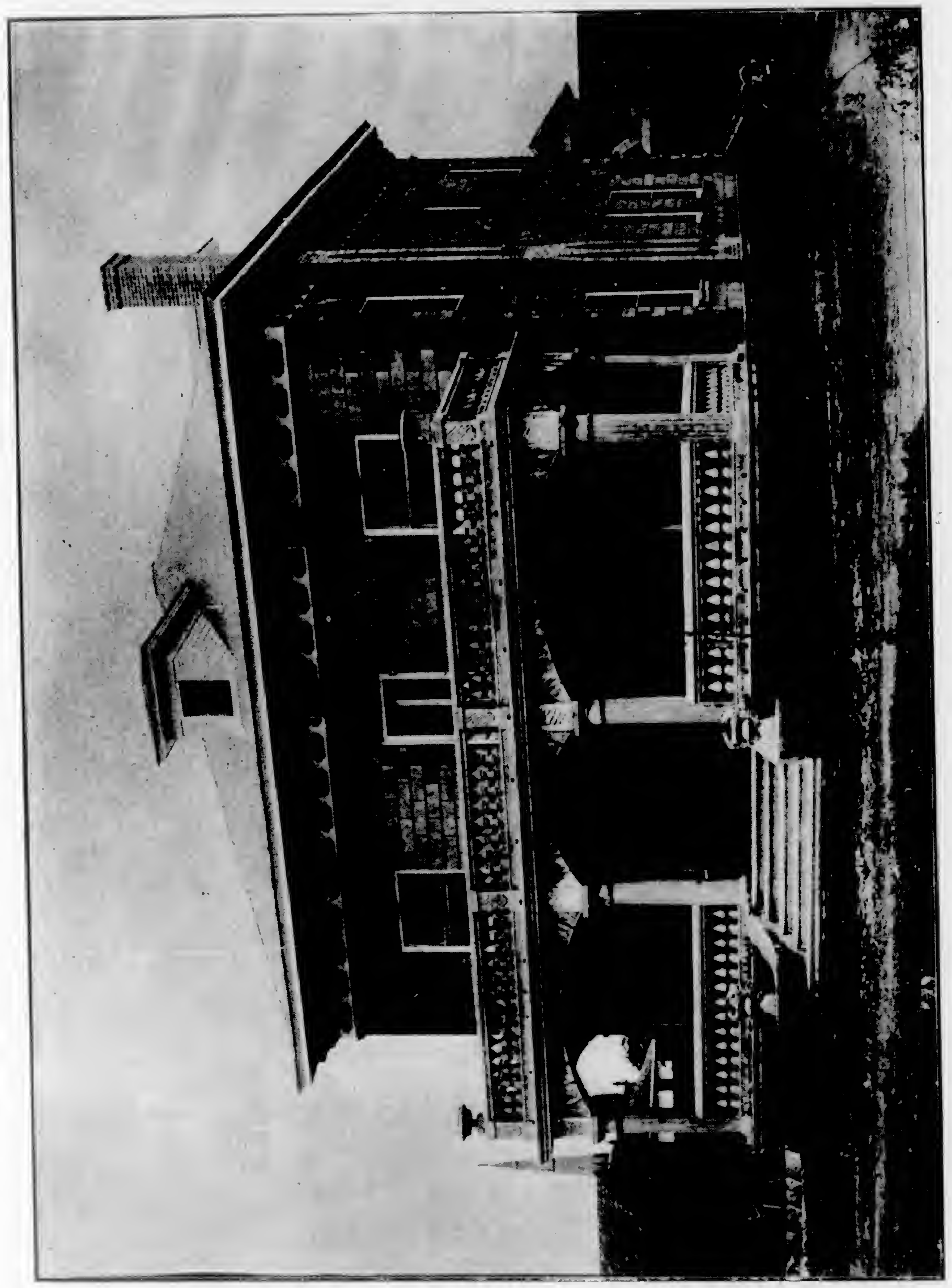
A CONCRETE house which is in many respects a pioneer in fireproof residence construction on the Pacific Coast, has just been completed in Fresno, Cal., for Mr. F. W. Osborn, vice-president of the Worswick Street Paving Company of that city. The structure shows the possibilities of good cement block construction and it also demonstrates that concrete can be used as satisfactorily and advantageously for residence work as business edifices. The house was designed by E. Mathewson, a Fresno architect, and is a two-story structure with basement and commodious attic, the latter well lighted and ventilated with dormer windows. Every part of the house from foundation to roof is cement, reinforced concrete being used in conjunction with the concrete blocks. For two reasons this form of building is likely to be popular in California. The first is that the hollow wall makes the building cool in summer and warm in winter, dead air being a poor conductor. The second reason is that of the fire resistance of concrete. In a residence district it may be said to be absolutely fireproof. In durability and strength, as well as in fire resistance, concrete is superior to stone, brick or any other material.

While these things had been known, the chief point of interest in the Osborn home is the demonstration that all these advantages can be combined with an artistic effect in exterior decoration that few had imagined was possible. The cornice, brackets and mouldings were all cast in cement and the angles and corners are sharp and distinct. The front porch is a striking feature of the house, with its massive cement columns and arches. The upper floor is of reinforced construction and as solid as the rock of Gibraltar. The steps are of artificial marble—a surface of marble chips set on a concrete base. It takes a high polish, is more durable than marble and less expensive, and is being extensively used in San Francisco and other places.

Two colors of cement blocks are used—buff and red sandstone—and the combination is a pleasing one. When the plans for the house were drawn they called for a wooden porch, cornice and brick chimneys, but Mr. Osborn desired to make his new home as near fireproof as possible, so he had concrete substituted for wood wherever practical. The blocks were manufactured on the Hercules machine.

The owner's one regret now is that he did not make all the floors of concrete, and roof the house with concrete shingles. These two features, he declares, will positively be embodied in the next concrete block house that his company builds. An excellent feature of the Osborn home is that all the chimneys are built on the outside of the house and do not protrude through the roof, as is usually the case in residence construction. This is most noticeable to the visitor upon reaching the attic. Looking about him he discovers that the usual chimney obstructions are missing, and he naturally inquires: "Where are your chimneys?" The chimneys, by the way, are also of concrete, being an excellent imitation of buff pressed brick. The attic forms one big room and has twelve small ventilators in addition to three large dormer windows. The owner calculates that there will be sufficient draught to keep the second floor of the house comfortably cool even in the hottest periods.

There is no special style in the architecture of the house, although it is exceedingly attractive and is probably the best example California has at the present time of the possibilities of concrete block construction. The house is about 42x48 feet, and contains nine rooms and a bath. It was built at a cost of $14,000. The floors are supported by concrete beams reinforced with cor-



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The interior decorations of the house are very elaborate. Most of the woodwork is in flemish oak. The ceilings are frescoed, while the latest frieze effects lend additional beauty to the living room, parlor, library and hall. In the dining room a panel ceiling and beam effect make a pleasing combination, with an orange colored frieze having clusters of grapes as the decoration. The parlor is decorated in Empire style, while the hall has the panel ceiling in flemish oak and an Oriental marine frieze.

One of the features of the house is the bath room, large and light and having a shower bath in addition to a commodious porcelain tub. The floor is of solid concrete, while the walls are of concrete tile.

* * *

A House Without a Chimney

Will the Twentieth Century see the passing of that cumbrous destroyer of artistic symmetry in dwelling houses—a chimney? Will it become a useless feature in the homes of the future? Stranger things have come to pass, yet we, accustomed to the methods in vogue for centuries, may have given the matter no thought. So used have we become to the employment of coal or wood for heating and cooking that an eventual release from the annoyance of smoke, ashes and dust has never occurred to us. Yet the problem of doing away with this form of fuel has been solved and a house without a chimney has made its appearance, says the Architects' and Builders' Journal. Electricity has made the departure from the ordinary possible. When Mr. H. W. Hillman, a prominent official in the General Electric Company's works at Schenectady, N. Y., commissioned an architect to draw plans for his handsome suburban residence, without chimney or flues, he rather astonished that gentleman until it was explained that electricity, which was to be used exclusively, rendered those adjuncts superfluous. The house was built and it has the unique distinction of being the only residence in America without a chimney. Electricity furnishes the light, supplies heat in ornamental radiators, does the cooking and operates numerous other devices of utility and comfort. It illustrates the advance made in the utilization of this comparatively unknown element. With new inventions which will lessen the cost of generation and appliances to enlarge the scope of its adaptability, electricity is destined to become a commodity of general use as a domestic as well as an industrial agent. Before the present century runs the half of its circle, chimneyless houses may, nay, will be, no novelty.—*Domestic Engineering.*

* * *

Brick-Makers' Convention

Secretary Theodore A. Randall, of the National Brick Manufacturers' Association, has issued the official call for the twenty-first national convention, to be held in St. Louis on February 4th to 16th. The call directs the attention of members of the association to what is announced as the best meeting the body has ever held. The invitation for the convention was issued by the United Clay Workers, of St. Louis and vicinity, who have planned a very interesting and profitable assembly. The American Ceramic Society will hold its annual meeting coincident with the gathering of the brickmakers, and the convention of the National Paving Brick Manufacturers will also be held at the same time. The morning sessions of the main convention will be devoted to business, while the afternoons will be given over to the inspection of clay plants and such other sight seeing.

Terra Cotta and Brick

The Bixby Hotel Disaster as Viewed by a Brick Man

By JOSEPH SIMONS, Los Angeles

ACTING upon the request of the Architect and Engineer, I take pleasure in submitting an article, from the standpoint of one interested in the clay industry, on the failure of the Bixby Hotel, Long Beach. It would be useless to try to disguise the fact that I am interested in clay products for everybody knows my life has been devoted very largly to that industry. My experience in building construction in the past twenty-five years coupled with the experience of those that have given their entire life to masonry construction should make me competent to at least criticise some parts of faulty designs and material.

"Reinforced Concrete"—a new name applied to an old thing, is to-day at its height. A few years ago our papers were filled with glowing articles telling how the meat problem had been solved, how the meat packers trust would soon be destroyed, and the only thing necessary to accomplish this would be for the meat user to purchase a pair of Belgian hares, buy a bale of alfalfa, feed the rabbits and eat the meat. In our community with some, it partook of the form of mild insanity. Choice bucks sold as high as $500 and does at about half that money, but at last it vanished.

I might mention another insane idea that has come over the people of late where they prophesied the literal destruction of the entire medical profession. Drug shops were to be driven from the streets, spiders were to spin their webs from bottle to bottle, doctors and surgeons were to be ignored and remembered only as an antiquity of the past, dislocated limbs were to be set, broken bones mended, cancers and tumors were to be cured, all by faith; it being true that in some instances where only imaginary disease lurked, the patient was benefited; and we find some at the present time still clinging to their original fanatical ideas.

Later on the minds of the people craved for another great and world famed idea, and they found it in a supposedly new kind of building material—reinforced concrete. Many able books and papers were written, many original and seemingly plausible ideas were advanced, many young, and some older and more experienced engineers and architects were carried off their feet by the tidal wave and are today firm believers in the theory that something can be made out of nothing—that to insert a few iron bars that are not even tied or welded together in a concrete column or girder is a mysterious wonder. They take up one of the numerous books that furnish formulas for such work and study with amazement, selecting as their guide in many cases the formula that prescribes the least iron and the least concrete to carry a stated load and start out and proclaim to the building public that they can erect a building at least 30 per cent cheaper than can be built of any of the old and tried forms of construction, not knowing that the formula they use for reinforced concrete is based solely on an assumption. A small cube of concrete that is made in a laboratory is tested and found to give marvelous results. Two inches of steel in length is placed under a testing machine and shows that it stands more than 60,000 pounds per square inch. The short bars are also tested for tensile. They assume still further that the adhesion of concrete to steel is from 50 to 100 pounds per square inch, not knowing that this seemingly grip of concrete to the bar is at the expense of the concrete column that they contemplated loading to at least 500 pounds per square inch; that the rods that are used in the girder are being held in place by the construction of the cement that surrounds them. They fail to look up Uncle Sam's Watertown Arsenal tests that are accompanied with engravings showing plainly that bars inserted in concrete columns or girders cause them to crack, as the steel does not contract with cement. And when one looks over the ruins of what was once a reinforced concrete building and fails to see a single rod or bar that sheared or broke that had been simply pulled out clear and clean as if they were the roots of some little tree or plant that was growing in the soft earth or sandy loam, one needs but little technical knowledge to say that the theory was a fallacy; that something cannot be made out of nothing; that if concrete, the same as any other material, is loaded almost to its carrying point, it only needs a slight vibration to destroy it.

After viewing the wreck and examining the concrete and steel, any fair minded man with experience will say that the concrete was good, the steel was good, and the design was wholly in the bounds of reinforced concrete engineering practice. It is my opinion that one of the direct causes of the collapse was due to the uneven shrinkage of the concrete beams and girders. Cement must shrink to harden, and it being impossible to protect the outer walls from heat and dry winds they necessarily shrunk in advance of the necessary columns and girders in the center of the structure, and when an undue and unnatural strain comes on this brittle material, there is only one result. Pages will be written trying to explain, brains will be wrecked trying to devise some excuse, the form of constructing columns and girders will be criticised, the manner in which the iron was placed in the girder will also be commented upon. Some, no doubt, will produce the lame excuse that because a few tile were used for a filler and in curtain walls that it was due to this material that the building fell. It will be claimed that if the floors had been built of solid concrete construction they would have stood. One small porch floor at the south that was only a few feet from the ground that received only a few flying bits of broken concrete with the exception of having the twisted bars pulled out of it and a large chunk broken from it remains in fair condition; but, on the other hand, there remains 1000 times the area of this floor that is built on the Kahn system that is in perfect condition. I do not claim that a fairly good building cannot be erected of this material if constructed on the right principal and given plenty of time to shrink and dry, but to try to erect a building where loads are transmitted to the columns by the girders the same as a class "A" steel construction, unless the same is built very low at least four times as strong as the formula we find in the book, looks to me like folly.

Concrete vs. Burnt Clay

By URIAH CUMMINGS*

IN THE Architect and Engineer of California for September, there appears an article by W. F. Barnes, which contains so much concerning Portland cement that is based on an apparent misconception of the nature of that article, as to call for comment.

We quote, "Is Portland cement some new irreducible mineral, or is it our familiar lime-rock and our familiar clay, crushed, pulverized, mixed and roasted sufficiently to expel the chemically retained water? Could not this roasting or burning proceed until from the lime-rock we have pure lime? Could not the same clay be burnt into an altogether different product? How then, in reason, can the mixing of these two half-burnt materials—either of which would be absolutely destroyed for the purpose in hand by a further application of heat—produce a fire-proof material?"

It is not often that one meets with so amusing a case as this. We were mistaken in thinking the limit had been reached when a few years ago a division engineer on the New York, New Haven & Hartford Railroad told the writer in a burst of confidence that "his road was using Mr. Rosendale's cement almost exclusively, but now that they had found a mine down in Portland, Maine, where all they had to do was to dig the cement out all ready-made, just shovel it into barrels; it looked as though Mr. Rosendale would have to quit. But, he supposed the latter had become rich enough to quit anyway. At all events this Portland, Maine, cement was giving old Daddy Rosendale a hard run on their road."

Mr. Barnes' idea that if you burn Portland cement long enough you would get pure lime, is certainly an amusing, if not an instructive proposition.

If Mr. Barnes would study the chemistry of Portland cement, he might avoid falling into so grievous a blunder as to write as he does about "these two half-burnt materials." He would know that limestone and clay, finely ground and intimately mixed together in certain fixed proportions, and subjected to a white heat, would become chemically combined: that after the expulsion of the carbon dioxide, the lime becoming thereby caustic, would attack and dis-associate the silicate of alumina, or clay, and itself enter into a new chemical combination in the form of a silicate of lime and alumina.

It is among the silicates that we find the materials which are known to possess fire-resisting qualities to a greater or less degree. Among these we may name:

Silicate of alumina—clay.
Silicate of lime,—some hydraulic cements.
Silicate of lime and alumina,—Portland cement.
Silicate of lime, magnesia and alumina,—most of the natural cements.
Silicate of lime and magnesia,—actinolite and tremolite.
Silicate of magnesia,—asbestos.

Some of our clays, i. e., silicate of alumina, will withstand a high heat, but many will not.

Those silicates which contain the caustic bases, lime and magnesia, will withstand a higher heat than will the aluminous silicates.

Silicate of magnesia, i. e., asbestos, withstands a higher degree of heat than the other silicates named, although the silicate of lime and magnesia, as in actinolite and tremolite, will endure an untold amount of heat without seeming to be in the least disturbed.

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*Mr. Cummings is the author of "American Cements." His headquarters are at Akron, N. Y.

Portland cement,—a silicate of lime and alumina, seems to retain all the heat resisting qualities that are due to the clay, or silicate of alumina side of its nature, which is enhanced by the lime which enters into its combination through the agency of heat.

In brief, the lime and clay in a chemical combination as in a Portland cement, will endure a higher heat than will either of those products taken singly.

A concrete made from good Portland cement and clean sand, when thoroughly mixed together and allowed time to harden, will bear a change from a white heat to sudden immersion without subsequent disintegration.

Take a bar of burnt clay, say two inches square and twelve inches long, and place one end in a blacksmith's forge and bring the bar to a white heat, and it will be found that the entire length of the bar has become highly heated.

A similar bar made of Portland concrete, with one end brought to a white heat, the other end will be found cool, and the bar may be handled by the cool end as well as though it had not been placed in the forge.

* * *

American Institute of Architects

THE next convention of the American Institute of Architects, to be held in Washington, D. C., January 7th, 8th and 9th, 1907, will commemorate the fiftieth anniversary of the Institute, founded in 1857. It is proposed to make this a notable meeting. A bronze tablet containing the names of the founders of the Institute will be unveiled in The Octagon, commemorating the occasion. During this meeting the Institute will inaugurate the custom of presenting a gold medal for distinguished merit in architecture. The first medal will be presented to Sir Aston Webb, the architect of the Victoria Memorial, who received the gold medal of the Royal Institute of British Architects and knighthood during the past year. This meeting will also be the occasion of a formal banquet, at which will gather those distinguished in the fine arts, prominent government officials, representatives of educational institutions, and men of literary fame. As ceremonial and social events will occupy the time of this meeting, no formal papers will be read, but the routine business and commemorative exercises will occupy the time of the delegates.

* * *

Trying to avoid work is often the hardest kind.

* * *

Never borrow trouble, but always be ready to lend it.

* * *

Some people climb to the top for the purpose of looking down on their neighbors.

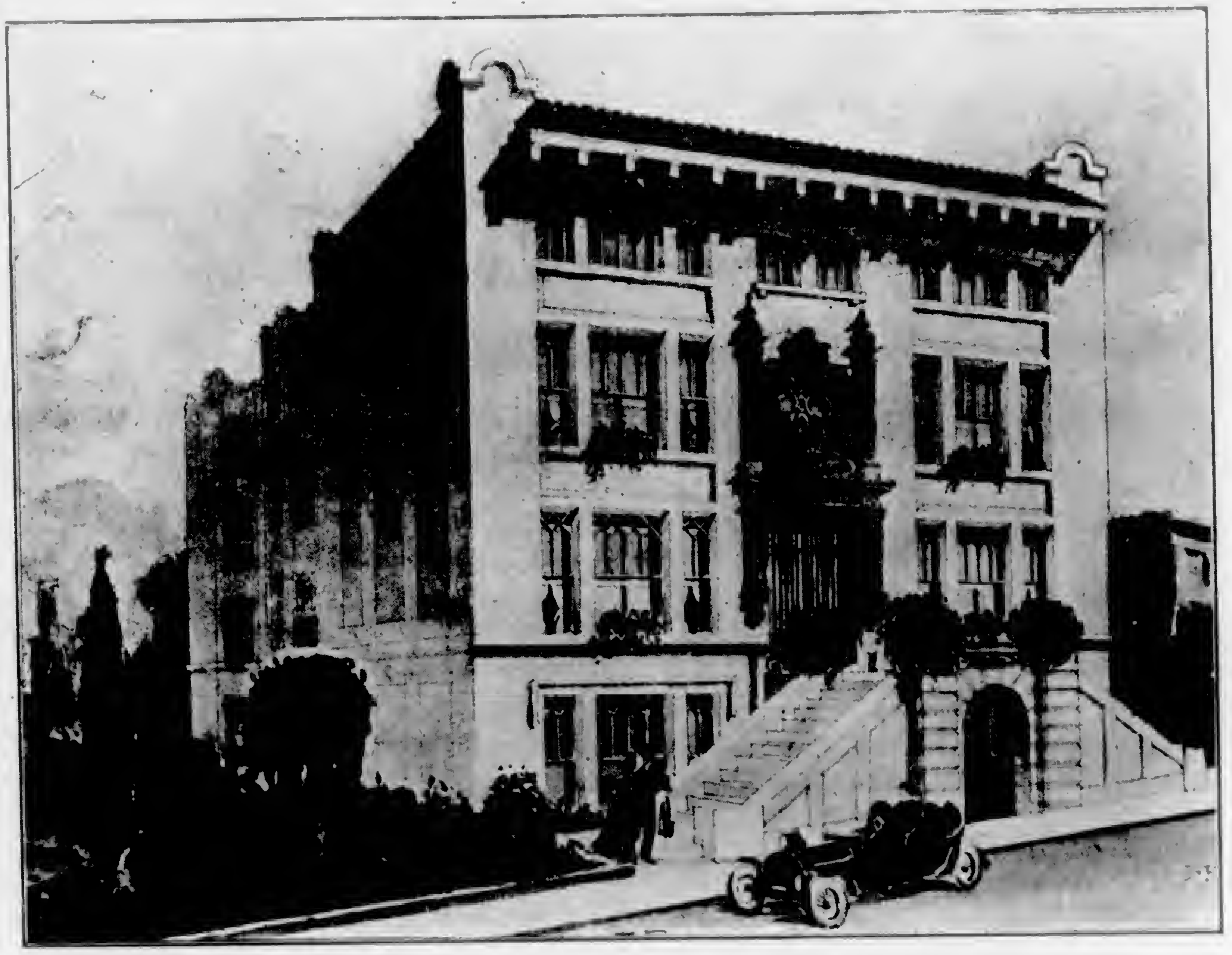
* * *

Many a man's idea of hospitality is to bring other men home and have his wife cook for them.

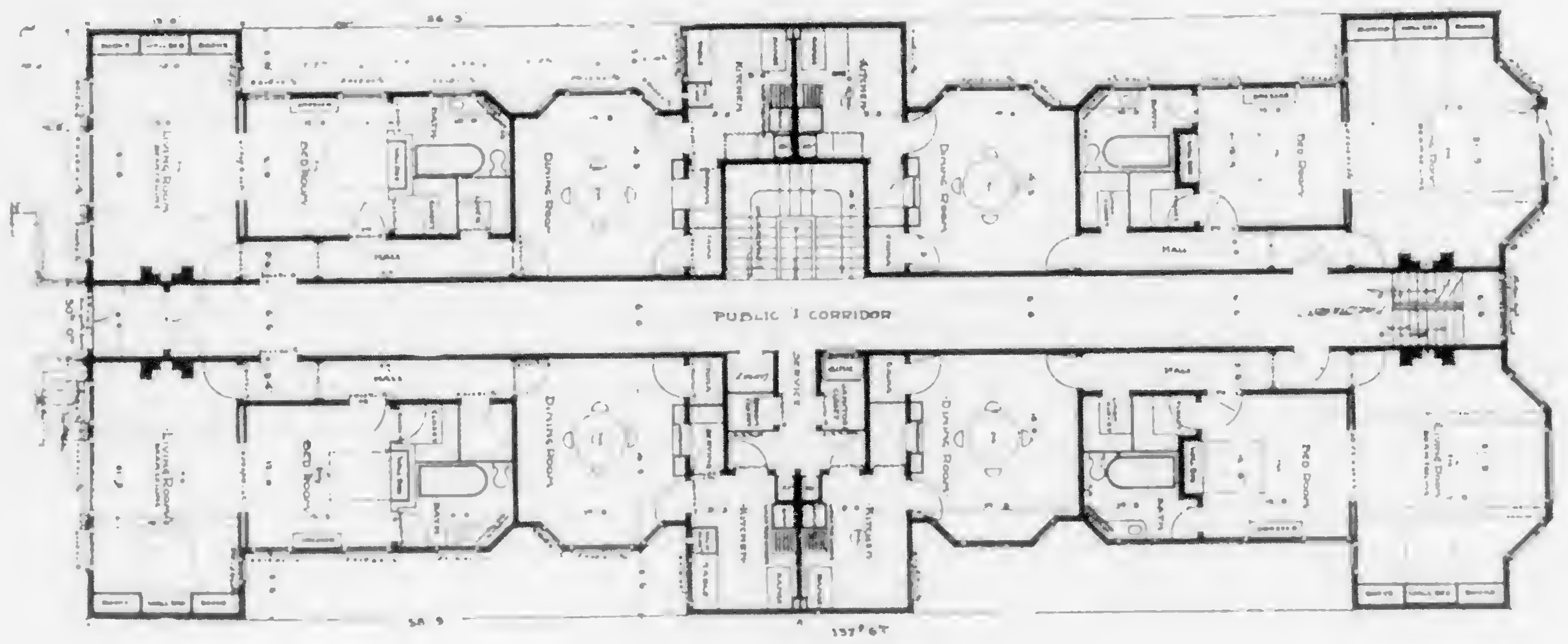
* * *

And some people are so industrious that when they haven't anything to do they proceed to do somebody.

Apartment House for Nob Hill

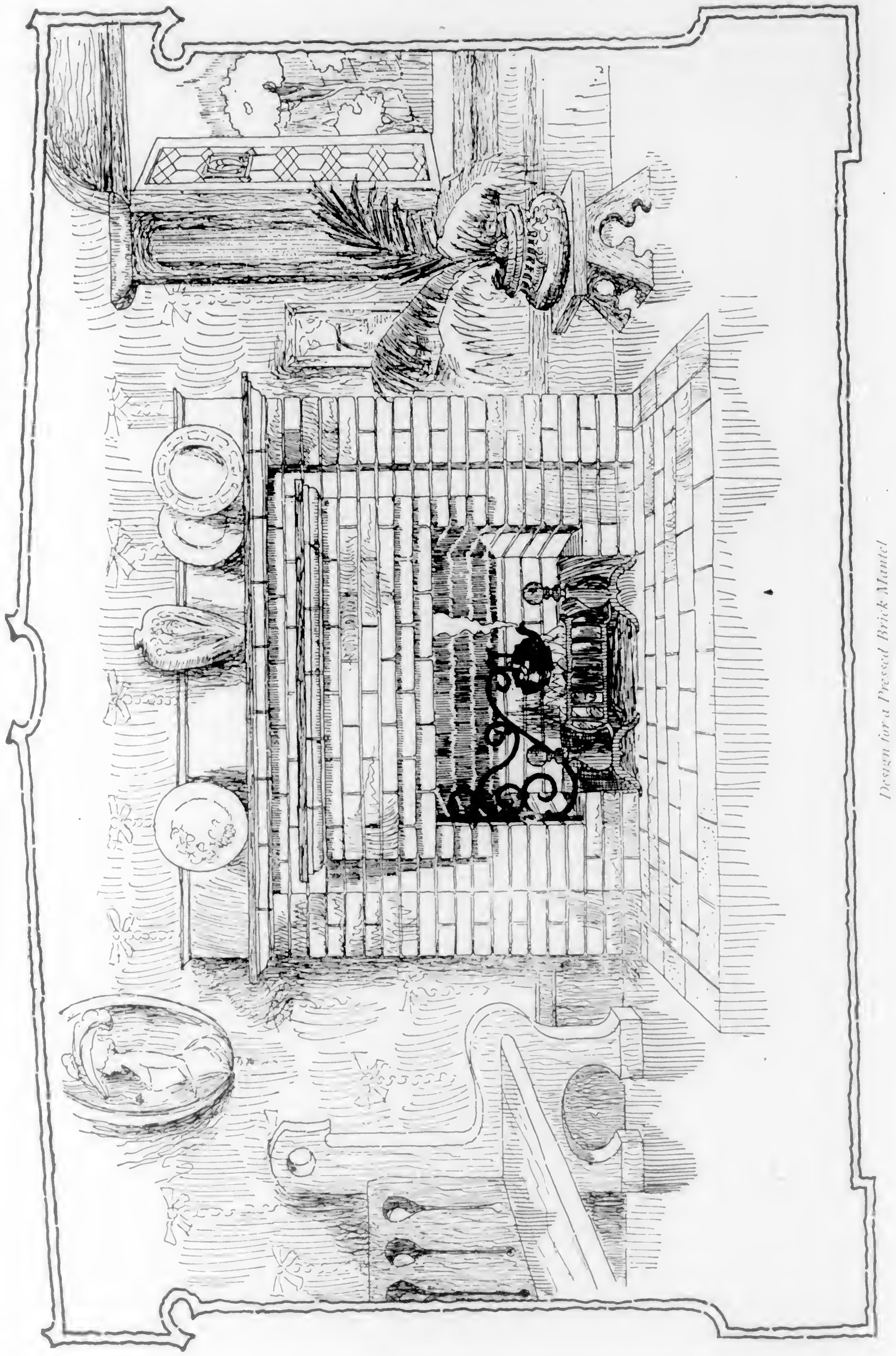


The Lewis Apartment House. Kenneth McDonald, Jr., Architect



Floor Plan of the Lewis Apartment House

The Lewis Apartment House which will be the first new building to be erected upon the aristocratic Nob Hill, in San Francisco will present when completed, a very charming adaptation of the Spanish Renaissance style of architecture. The color scheme of the exterior will be a warm cream tone to the rough cast plaster surface with the deep sienna color of the main entrance and will have the real Spanish tile emphasized by green Gruby tile inlaid under the cornice. The interior will be carried out in antique oak finish with dull white wax surface, all furniture, mantels, wall beds and woodwork being designed by the architect in the Spanish Mission style to harmonized one with the other.



Design for a Pressed Brick Mantel

Cement and Concrete

A Plea for Good Cement Tests

By IRVING C. ALLEN

IN THE rebuilding of San Francisco a fundamental and important factor, if not the most important factor, is that all construction material be of good quality. The use of poor and unsound material, of unknown, though to all outward appearances of good quality, is certain sooner or later to develop defects. The one way to be sure that good stone, good steel, good brick and good cement be used, is that it be thoroughly and scientifically tested.

This is especially true of cement, for cements vary greatly in cementing properties, those qualities which give it value as a building material, and because, unlike most other materials of common use, the qualities of cement are not at all discernible excepting by scientific tests.

Under the term "cement" there appears in the market inferior grades which should not be used in any structure whatever. The use of cement in concrete foundations and especially in reinforced concrete walls and floors will be one of the largest factors in the reconstruction of the city. The stability of reinforced concrete buildings depends not only upon the tensile strength of the reinforcing steel used, but also depends directly upon the tensile strength and durability of the cement.

In San Francisco cements are used from Germany, England, Japan and from many different factories in the United States. No two of these cements are alike in cementing properties. Even cements of the same brand vary in quality from time to time. Cements vary over a wider range in fineness, specific gravity, time of setting, in the quantity of sand they can advantageously incorporate, in hardness, porosity, friability, in tensile and compressive strength, in permanency and durability.

The United States Government fully appreciates these facts and all materials used in government buildings are scientifically tested, and none but those found sound are accepted.

Types of sound and unsound construction are shown in the Ferry Building on the one hand and in the San Francisco City Hall on the other. If the City Hall had been subjected to as rigid an inspection during its construction as the former it would probably be intact today. The great importance of cement inspection cannot be too strongly or too frequently brought to the attention of the builders of San Francisco. and for the information of those builders who are not themselves engineers, but who wish to understand something of the essential points of inquiry as to the cementing properties of any cement, there here follows a brief outline for cement testing.

Cements, broadly speaking, are classed as "Natural Cement," and "Portland Cement." Natural cement is made from burning masses of natural rock, and approach but approximately in cementing properties to the more carefully prepared Portland cement. Natural cements vary greatly in composition and quality, but all are of comparatively low value and are but little used at a distance from the place of their manufacture, and for our purpose are not further considered.

Portland cement is made from carefully selected material and is burned at a much higher heat than natural cement. The raw burned product, in small "klinkers," is of a bluish gray color and very hard. These klinkers are powdered and form the Portland cement of commerce.

On the *fineness* of this powder depends largely the strength and soundness of the cement after setting, and as the larger particles are practically inert, the strength, and particularly the tensile strength, soundness and permanency when mixed with sand increases with the fineness. A cement of the highest quality and finely powdered under certain unfavorable circumstances may deteriorate and become granular and even lumpy. Cement, by weathering or hydration, as is frequently the case during long sea voyages or after standing a considerable time in improperly closed storehouses, begins to set en masse, and grains and even lumps are formed. These grains are inert and the deterioration of the cement is proportional to the degree of hydration, and is determined by proper screening.

As Portland cement is a definite product, whose percentages of lime, silicia, alumina and iron oxid vary only between narrow limits, *chemical analysis* renders valuable service in the detection of adulterations with inert materials, such as slag and ground limestone, or determines the percentage of objectionable ingredients, as magnesia and sulphuric anhydrid, but is not of itself conclusive as to the soundness or unsoundness of a cement.

The *specific gravity* of a Portland cement, though of little importance to the construction engineer, assists the expert in at once pointing to a faulty cement. It is lowered by under-burning or by adulteration, or by hydration. The specific gravity of a Portland cement rarely falls below 3.10, while that of a natural cement or slag cement, or a Portland cement adulterated with slag, will rarely rise above 3.00.

A certain minimum *time of initial and final set* is of importance to the workmen and is usually determined and reported by the expert.

The *tensile strength*, formerly not considered of much importance in itself, as a cement was rarely subjected to a direct tensile force, has become of paramount importance. High grade cement is today recognized as the best adapted binding material for stone and brick. The tensile strength is indicative and in a measure proportional to the compressive strength. The three points of most general interest, however, are

(1) The decrease in tensile strength with increase in the percentage of sand;

(2) The variation in strength due to the differences in the character of the sand used, and

(3) The increase in strength with the increase in age.

The *compressive strength* of a cement or concrete is a matter of direct practical importance when used in foundations and walls carrying a heavy load.

For a given age *the ratio of compressive to tensile strength* of a Portland cement is practically fixed; this ratio increasing with the age and also with increasing proportions of sand. In practical use, after one year the average Portland cement mortar will have a compressive strength about ten times as great as its tensile strength.

As it is highly essential to determine at once those qualities of a cement which tend to destroy its strength and durability, and as these tests are of necessity made in a very short time, what is known as accelerated tests for *constancy of volume* are made and a faulty cement is revealed by cracking, checking, swelling, distortion or disintegration, and gives a fair idea of the durability and permanency of a cement.

The above outline, of necessity brief, is given with a view to pointing out the more essential points of inquiry which should be made by every one using cement as a building material. These tests are made according to definite specifications of the United States Reclamation Service, American Society of Civil Engineers, Imperial Governments of Germany, of Great Britain and of others, and when so made and the information thereby obtained honestly used, will insure a stability and durability of structure not otherwise attainable. The time to find out what you are paying for is before the material has gone into the building, not after the injury has been done by allowing inferior or worthless cements—cements that for any reason lack the qualities that are absolutely essential to give good, durable, and lasting concrete—concrete that grows in strength with the year and that will endure after other forms of construction have returned to dust.

* * *

Uniformity of Design and the Proper Placing of Reinforcement

By S. A. JUBB, C. E.*

REINFORCED concrete may be looked upon by many as a fad or passing fancy: exploited, as it is, by the many enthusiasts with a patented bar or an exceptional brand of cement, and their beautiful booklets would lead one to believe that there were no limits to its uses. That it is not a new thing is known by all who have followed the engineering journals for the past ten years, and, judging by the millions of dollars of reinforced concrete structures already erected and being erected throughout the United States, ranging from the light skeleton structures, office buildings many stories in height to immense warehouses and factories carrying loads up to 1000 pounds per square foot for use of machine shops and factories running drop hammers and all kinds of heavy machinery, it is very evident that reinforced concrete has passed the experimental stage.

Uniformity of design is possible from the fact that as much is known about the principal elements of reinforced concrete as of any other building material, and it can be designed within as close limits, taking for example the principal factors of its make-up, Portland cement and steel. Portland cement is now manufactured by many concerns who will guarantee its quality; and, when protected by the tests as all should be, the results are very uniform. The style and design of the steel reinforcement for concrete work is not in any sense as well established as to economy of design and construction as is the preparation of and the mixing of the concrete elements. There are many patented types of reinforcement and bars of more or less value; but when we have at hand a material the qualities of which are so well known as are those of medium steel, why take chances with questionable combinations? The manufacture of structural steel has reached such a state of perfection today that with the standard specifications and the usual mill inspection its quality is beyond question. With these two standard materials of known qualities it would seem to be but a simple matter to obtain a uniformity in the method of combining them.

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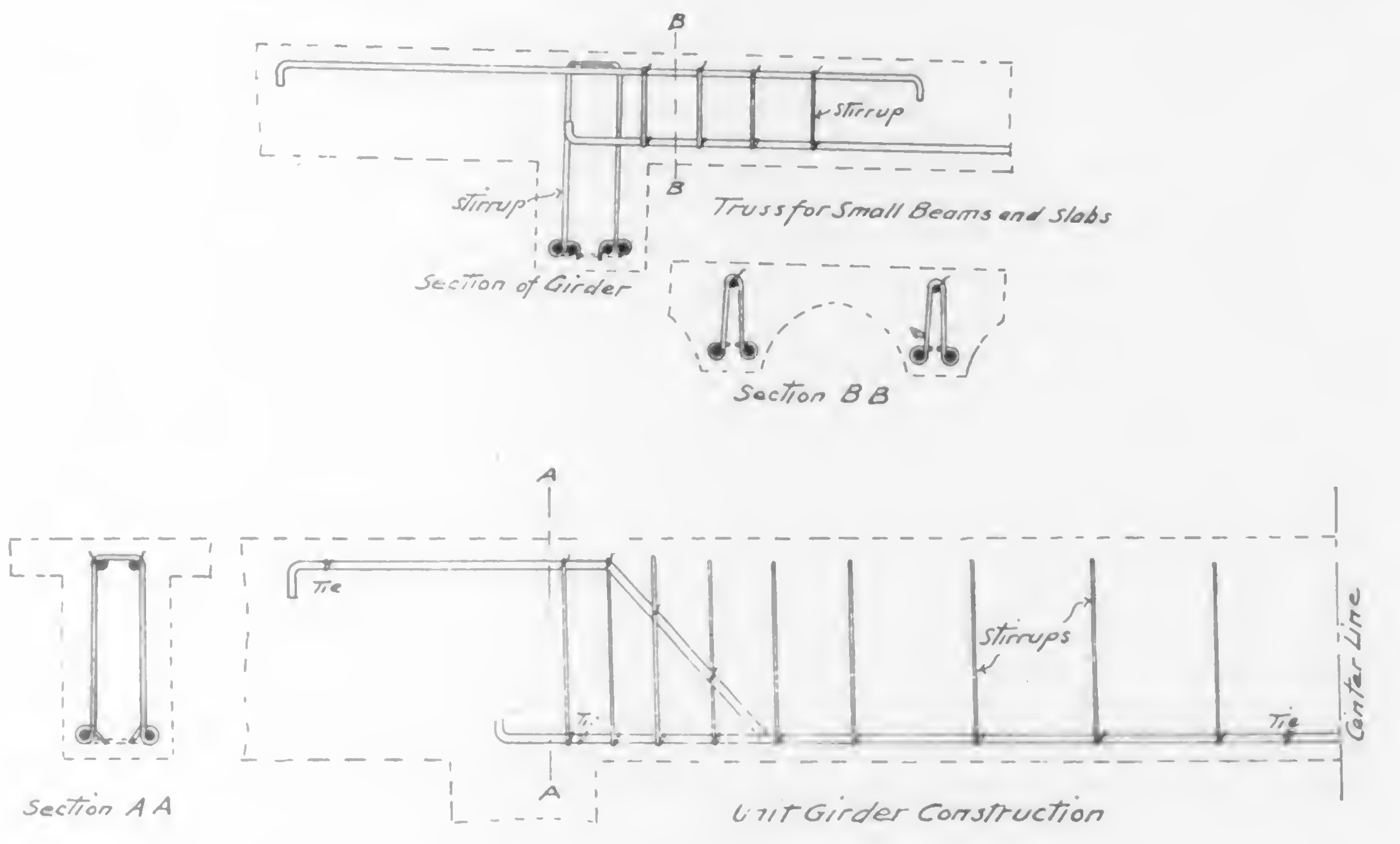
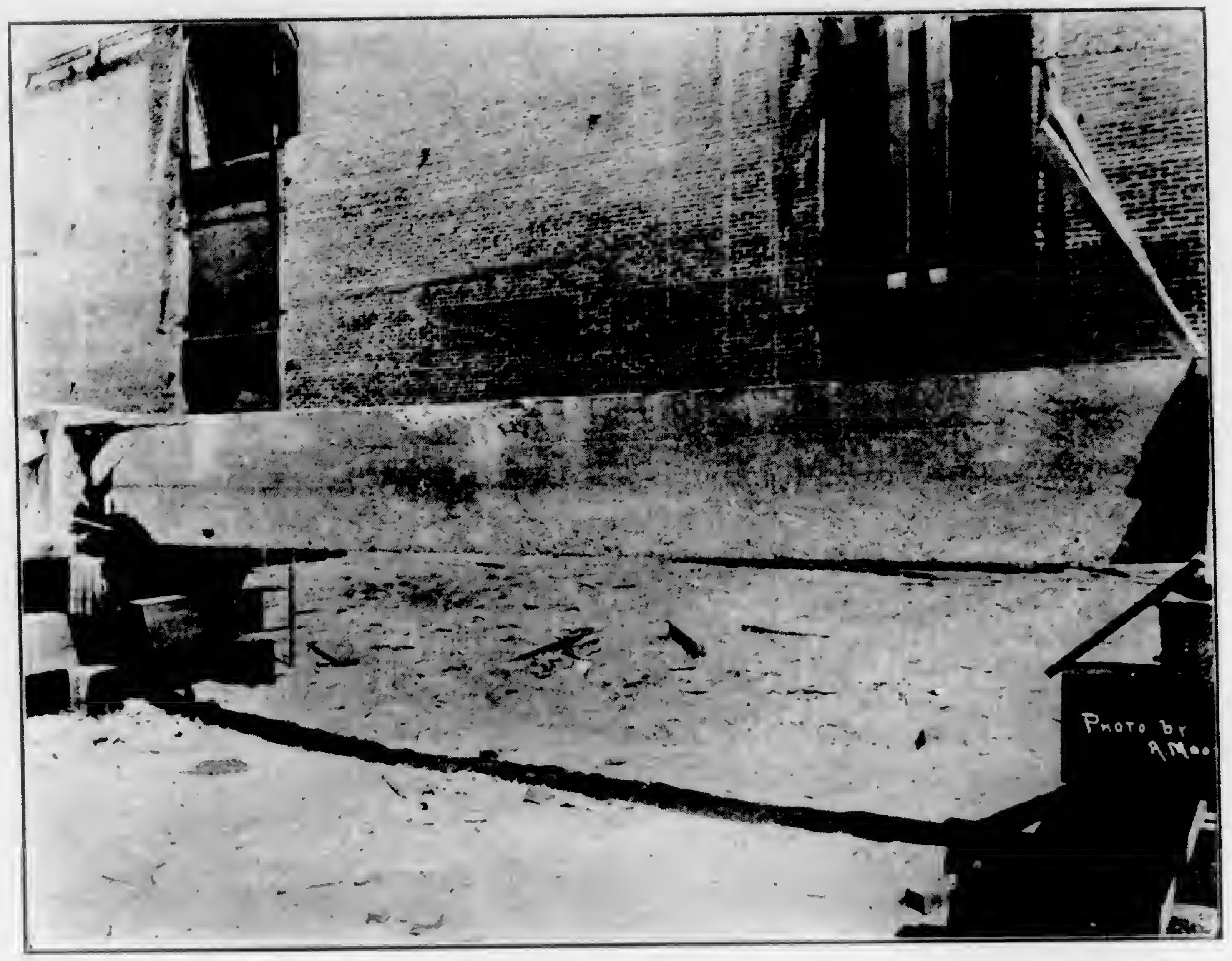
*Mr. Jubb is a civil engineer with an office at No. 2117 California street, San Francisco.

Much has been written on the design of reinforced concrete beams and slabs, and the writer does not propose to add to the great amount already written on that subject, believing that there is a much more important point which requires attention; i. e., the fabrication and placing of the reinforcement.

Of what value are the hours of study by skilled designers if the results are to be destroyed by some laborer to whom the final carrying out of the work is left? Of what value is the elaborate formula and the determination of the location of the centers of gravity of the areas of steel and concrete in the sections to fractions of inches when the placing of the steel can be and often is varied inches, through the ignorance of the men who finally place it. The writer does not wish to belittle the designer, for skill as well as a thorough knowledge of the design is necessary for the proper determination of the reinforcement and each beam should be as carefully analyzed as are complicated plate girders. Regular strain sheets should be prepared and preserved for record and all elements carefully tested. The designers' work is only partially completed when it is left as 90 per cent of the work is today, with a mere statement on the plans that so many rods are required here and so many there, leaving it entirely with the foreman to guess when and how they are to be placed. The true engineer will design a product the result of his calculations which, like the built up section, can go in but one place and that the right place. It should not be possible for a rod to be omitted or displaced during the work. The reinforcement should be so designed and fabricated as to leave nothing to the erector but to carry out the plans and place the various members as is so well exemplified on all steel buildings and is just as easy of accomplishment on the concrete building. Only yesterday the writer visited a concrete building, in the construction of which he is interested, and upon pointing out to the man in charge of the placing of the steel that more rods were in a given place than were called for upon the drawings, he replied, "Guess that is so, and I will have to steal some from some other place to make up." This might not result seriously, but would most surely, if rods were taken from an important beam or girder. Reinforced concrete construction requires close, continuous, and intelligent supervision.



Showing Mr. Jubb's Idea of Unit Girder Construction



Full Size Test for End Anchorage and Shear

The writer submits a design which was evolved after a careful study of all known tests of reinforced concrete, all the different types and methods used and all the practical as well as theoretical requirements for such a standard of reinforcement, and has been used with success on many large and important structures. This type of reinforcement may be seen in use on the new eight story office building now being erected at the corner of California and Drumm streets, San Francisco. This design avoids all patents and can be modified to meet practically all cases. This type of unit girder construction has many advantages which cannot be enumerated in this brief article and ensures very positive and exact location of the steel in the concrete in its theoretical position as called for by the stressed diagrams for each case. Its construction is completed easily in a shop where the reinforcement is systematically assembled and fastened so thoroughly together that it forms an independent truss so rigid that it can be handled, and transported and will resist the ramming of the concrete around it without becoming displaced or distorted. Its use will also save time and systematize operations to a valuable degree. With such or a similar design using economical sizes of medium steel rods there would be no object in furnishing the design for the privilege of supplying the material. The architect would do as is now done with a steel frame building; that is, turn the plan over to the engineer with a request for a design and list of reinforcing material which can be obtained from numerous firms who stand ready to guarantee its quality. The matter of cost for such a design is, naturally, the next question to arise. The writer was connected with an analysis of several hundred tests designed to ascertain the relative advantages of the several bars now on the market, and the type of reinforcement here described invariably supported more load per dollar cost than any others.

The placing of the steel is very important and should be watched by inspectors who know the real meaning of reinforced concrete. The writer has, within a short time, visited nearly all of the reinforced concrete jobs in this city and vicinity, and on no job did he see even a satisfactory attempt being made to properly separate the reinforcement from the forms. The slab rods especially, were allowed to lie flat on the forms, an occasional attempt being made to lift them—but they immediately settled back or were trodden down by the men working the concrete. The whole success of reinforced concrete as a fire resisting material depends upon the reinforcement being properly covered with concrete; and this point, if not watched with great care, will lead to bad results. The necessary covering of concrete may be injured by fire but when the concrete is of sufficient thickness, the steel will be protected, and the injured part can be replaced by mortar and put in as good condition as ever.

Much has been said about the strength of connections. The writer does not consider there are connections in a properly designed and constructed reinforced concrete building. The photograph shows a beam tested to destruction. There was no pulling out of the bottom rods from the concrete at the support such as would have been the case if the anchorage were the weaker part. Among several other important points demonstrated in this test was that the failure occurred by vertical shear and at a much less load than the longitudinal steel would carry theoretically, which is allowed its full value by many designers. That this beam was well balanced in design is shown by the fact that the three principal types of failure appeared simultaneously. First, tension cracks near the center of the beam, and at almost the same time, crushing of the concrete took place on the top at the center; and before more load could be placed, the failure shown in the photograph took place. The writer believes beyond question, that the type of reinforcement shown, or a modification of it, will give perfect connection and security at all joints; also that the ends of the beam rods should be hooked or extended into the other members or walls. The mere landing of the end of the rod in the adjoining member for the length of from 8 to 12 feet as is often the case is not good practice—I refer now to where continuity is not possible. When a concrete building is properly designed and erected, there is less chance for a weakness to appear than there is in a steel structure, and from its monolithic nature the strength of the members are very much increased.

* * *

Mrs. Grouch—Why, Guy, dear, what on earth makes you walk so unsteadily?

Mr. Grouch—Been to the roller rink, m'dear, 'n' can't lose the motion.—Philadelphia Press.

* * *

Tommy Twaddles—Oh, I don't want to go to school.

Pa Twaddles—But don't you want a good education?

Tommy Twaddles (ingratiatingly)—No, pa; I'd rather grow up to be just like you.—Tit-Bits.

Fire Protection

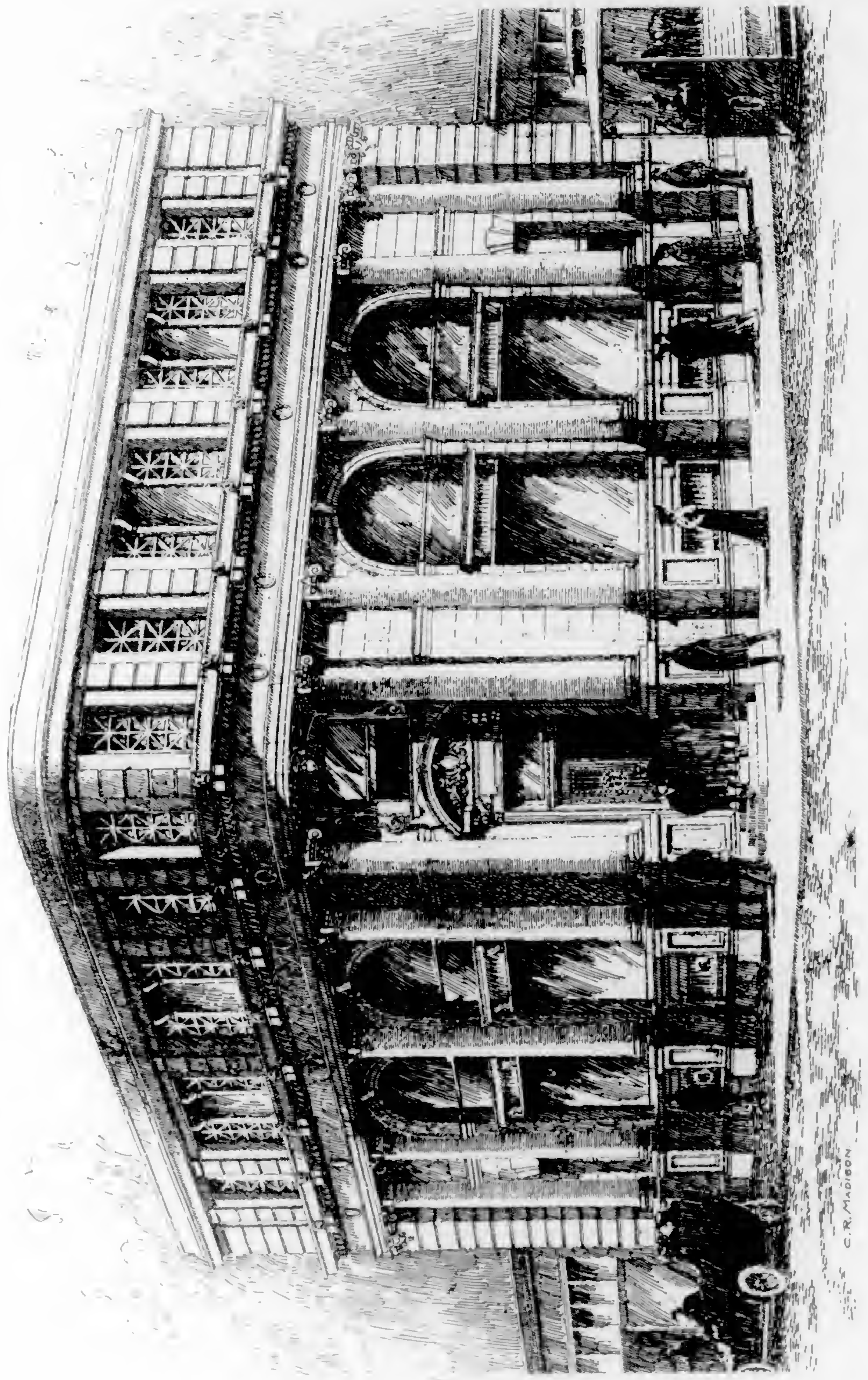
Installation of Sprinkler Systems

By J. A. LOEB, in Building Management

A SPRINKLER equipment properly installed in a well constructed plant is a declaration of independence. In the first place, the gamble as to probabilities of the risk burning down is reduced to a minimum of speculation, if not to a "sure thing" in favor of the negative. Buildings properly equipped do not, generally speaking, burn down or even result in severe losses unless an explosion or the breakage of a water main cripples the sources of supply. Secondly, the insurance companies, realizing these conditions, are eager for "sprinklered business" and offer many concessions in order to secure it. "Sprinklered" rates average more than 50 per cent less than rates on ordinary business; often the reduction in premiums exceeds 90 per cent of the rate before equipment. Thirdly, owing to the remote likelihood of a severe fire, the necessity of carrying insurance at all is under many conditions debatable. With a well built building, not too hazardously occupied and thoroughly equipped, the insurance is a second anchor against a very unlikely ill wind rather than the main-stay for expected and dangerously normal conditions.

It has been said that every fire has developed from a stage where the blaze might have been extinguished with a cupful of water. The sprinkler equipment is designed to furnish that cupful of water at the incipient stage.

The sprinkler equipment in its fullest sense consists of a system of pipes leading from the sources of water supply to a series of outlets inside and outside the risk to be protected. When the outlets are designed to protect the interior of the building against fire originating within they are fitted with automatic sprinkler heads. The heads consist of four main parts; a base which screws onto a distributing pipe, a valve seat held in place against water pressure inside the pipe by a strut which is secured in position by solder which will melt at a predetermined temperature; a deflector opposite the valve seat is arranged to distribute the issuing water over the desired area. The action of the head is simply produced by the melting of the solder at a temperature corresponding to the danger point of the space to be protected, say at 155 degrees F. The breaking of the struts loosens the valve, which is thrown out of its seat by the pressure of water in the pipe. The water is dashed against the deflector and is thereby distributed over the ceiling above and the floor below within a radius of ten feet, more or less.



Portuguese-American Bank Building, San Francisco   C. A. Meussdorffer, Architect

Cotton Bros., Contractors

Apart from other considerations, the chief factor in determining the spacing of heads is the construction of the ceiling. A smooth ceiling offers less resistance to the distribution of water than any other form of construction and consequently the largest area may be allotted to this kind of building. This maximum area is about 100 square feet per head, depending more or less on the economical arrangement of piping. Under no circumstances may heads be separated in any direction by more than 12 feet (and 10 feet is a more common practice). If the heads are 12 feet distant along the line of pipe, the lines will be required to be suspended at a distance of 8 feet from each other. Or if the pipes are 10 feet apart, the heads may be spaced 10 feet on line.

A very common variant from this type of ceiling is one in which the smooth ceiling is attached to the lower surface of beams which pass above the main girders. The ceiling then becomes a series of "bays" separated by girders, the bays offering a smooth ceiling; but the distribution will be somewhat obstructed by the lower girders. Under such circumstances the economy of distribution is largely affected by the distances between girders. The width of bays is measured from center to center of girders and one line of pipe is considered sufficient in bays up to 12 feet in width. Under such an arrangement a bay between 8 feet and 12 feet in width would produce the greatest economy, as each head would receive practically the maximum allowance of area. With narrower bays, however, the economy is diminished. So for 7-foot bays the maximum area is 84 square feet and for 6-foot bays only 72 square feet. For bays of greater width than 12 feet two or more lines of sprinklers are required. And here is again an opportunity for arranging either for an economical or a wasteful distribution. From the same causes as in a single pipe bay, a two-pipe bay offers economy when the width is between 16 feet and 24 feet. It is wasteful when the width is between 12 feet and 16 feet.

A further variation occurs when the ceiling is divided into panels by having a system of cross girders with the lines of girders at right angles to each other and all dropping below the ceiling arch. For the greatest economy in this construction similar rules to those above quoted may be formulated. The individual panels should have areas so arranged that the number of sprinklers will be one one-hundredths of the square feet enclosed. This would indicate an economical arrangement after the following fashion: In smooth panels neither line of girders should be less than 8 feet on centers. If one line is spaced 8 feet apart, the intersecting one should be 12 feet on centers. For square panels 10 feet by 10 feet is the most economical condition, allowing one head to the panel. Bays of 9 feet by 11 feet or similar combinations are nearly as economical. Of course multiples of either dimension may be used with equal propriety as 16x12 feet, which would give two heads to 192 square feet. Panels 20x20 feet would require four heads. An arrangement like 15x15 feet, which would also require four heads, is therefore to be considered a wasteful distribution.

In manufacturing or wholesale warehousing buildings the usual type of construction is not characterized by smooth ceilings even in bays or panels, but rather by the so-called joisted construction, the manager will know how to dispose his stock so as to utilize the available space without encroaching upon the reserved portion below the ceiling.

In some instances underwriters have permitted the heads to be reversed, the pipes being in that case embedded in the ceiling. This is done sometimes in fire proof stores where the presence of pipe would destroy the architectural effect. It is never done where there is any danger of freezing or where a "dry system" is used.

All fixed equipment such as shelving, bins, tables, etc., forms an obstruction to the spreading of water and must therefore be provided for. Shelving is most frequently met with in poorly managed plants and is a catchall for materials, which would have been sold or removed if it had been with other stock on the place provided for it. Most shelving is erected with an idea of economizing space, but rarely does so and is often expensive, unnecessary and cumbersome.

In a building equipped with sprinklers shelving is especially to be avoided. If it is absolutely necessary the shelves should be made as narrow and as accessible to sprinklers as possible. The floor of the shelf should be slatted with large spaces between the boards. Under such conditions, it may be possible to avoid the necessity of putting one or more lines of sprinklers under the shelf. Where the shelves are wide and tightly floored, sprinklers will be required below; and in this case the advantage of additional storage space will frequently be lost on account of the necessity of leaving two feet of headroom below the shelf. A table is permitted to pass without sprinklers beneath unless it is of considerable width. The usual requirement calls for heads to be located beneath any table over 5½ feet wide. Such tables are most frequently met with in cutting rooms of wholesale clothing houses, etc. If possible to arrange it, the table should not be rigidly fastened in place; and it is often possible to avoid the necessity of sprinklers below the table by leaving a loose board 10 inches to 12 inches wide running lengthwise through the center, which is removed at night.

Clothes cabinets, telephone boxes and similar enclosures, when they cover more than 4 or 5 square feet, may be required to have a sprinkler on the inside. In order to avoid this it has become customary to have a muslin or canvas top. Partitions are not in themselves objectionable even when of combustible materials. The chief objection to their erection lies in the necessity of placing them so that both sides will be protected or in placing the heads to suit the partition. This usually produces a less advantageous arrangement of heads than would otherwise obtain. A partition, the upper portion of which is made of wire fence netting, is not considered an obstruction. In some cases slatted partitions have been acceptable without additional provision. Hollow partitions are exceedingly objectionable unless entirely fire proof.

The most harmful features of construction, aiding in the unchecked spread of fire, are those involving large concealed spaces into which it is impracticable to erect sprinklers. Under this heading come false floors and ceilings and sheathed walls. The false ceiling of combustible construction is most frequently met with under roofs of refrigerating or warehousing plants and is in effect a sort of attic or cockloft which in the course of years becomes a receptacle of inflammable rubbish. False floors sometimes are also used for insulating purposes, but sometimes are intended to raise an old floor to a higher level in order to facilitate trucking from an old building to a later one which has higher floor levels. Whatever the occasion that makes such a concealed space necessary, no sprinklered building can be considered well equipped unless heads are introduced into this space. For that reason they should, if possible, be erected at the time the building is constructed and the concealed space should be of sufficient height to be accessible to workmen. If it is absolutely necessary to have the space very low it is then advisable to provide numerous fire stops within it by tile walls, brick nogging or a similar method so as to prevent a great spread of fire.

Failure of the Bixby Hotel

Official Reports of the Special Committee from the San Francisco Cement Workers' Union

By T. E. KEOUGH

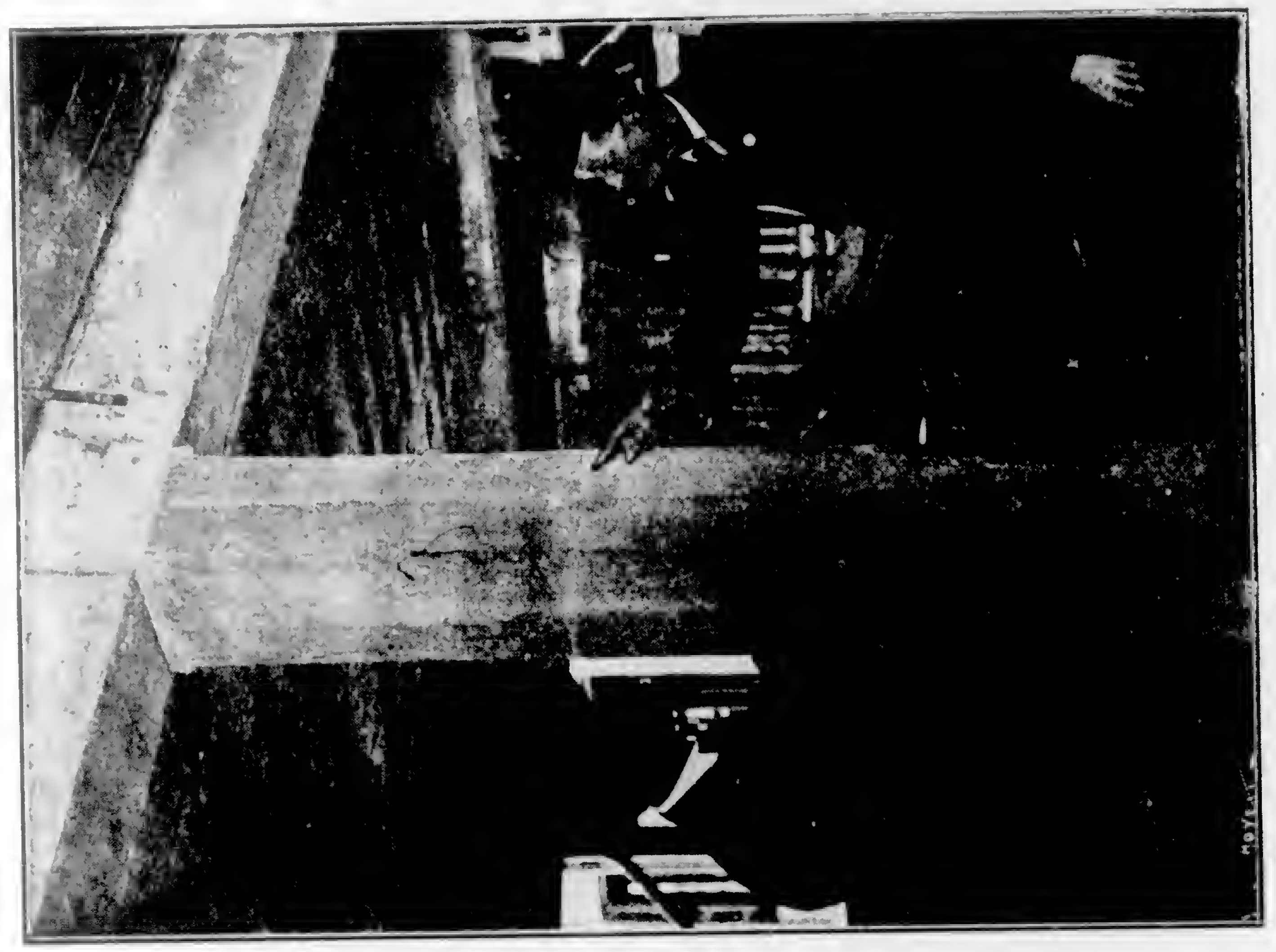
IN accordance with instructions from this Union on November 14th, I went to Long Beach, Los Angeles county, Cal., on November 16th.

There I met Architects H. A. Schulze and Wm. Koenig, and with the full knowledge and consent of the architects and owners of the building, I at once began an investigation to obtain all the information possible as to the cause responsible for the collapse of a so-called reinforced concrete building known as the Hotel Bixby, in the wreck of which ten workmen lost their lives, at about 9:30 a. m. on the ninth of November last.

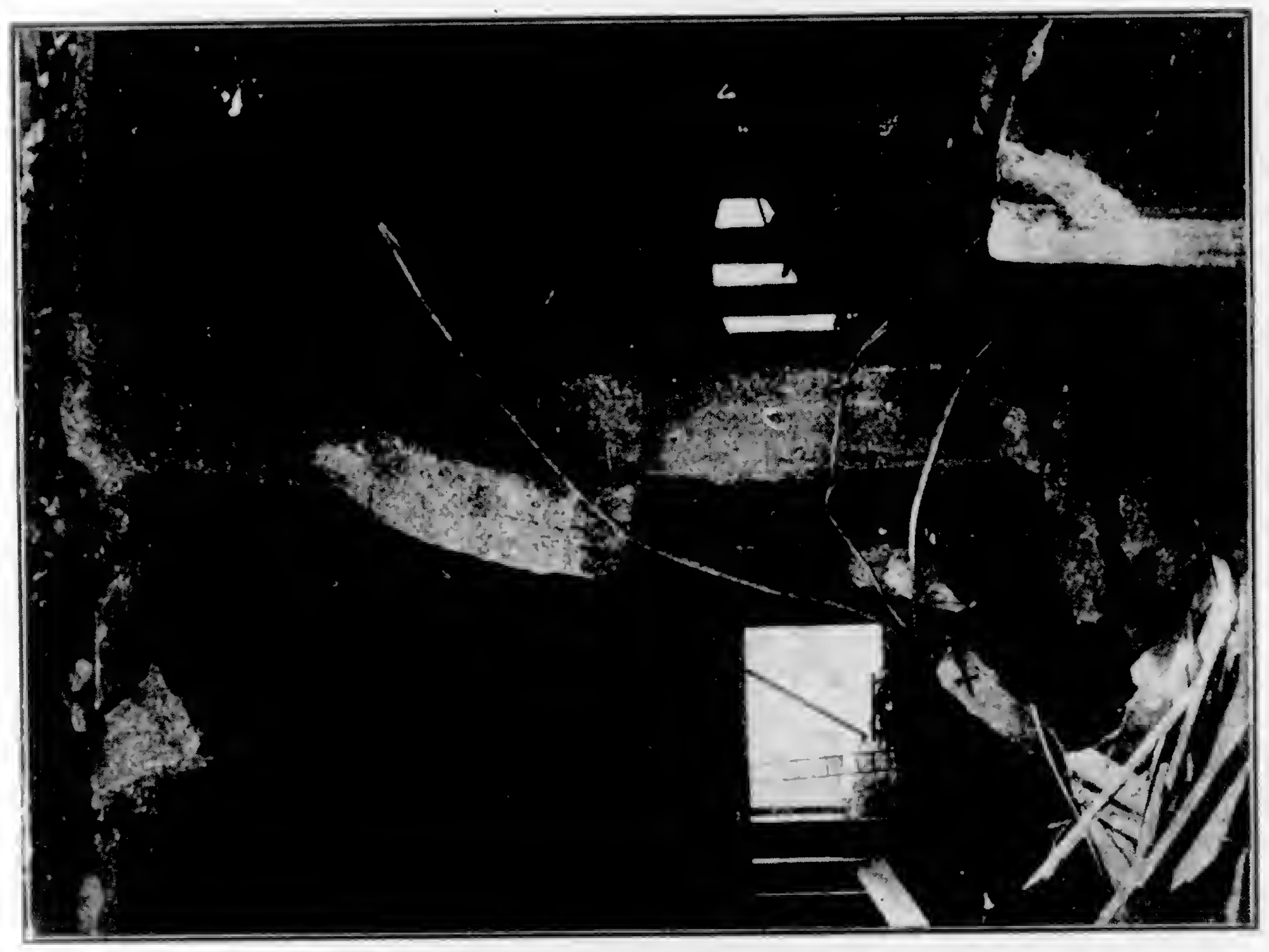
In presenting this report I will not presume to discuss the technical details of reinforced concrete construction after so many well-known architects and engineers have expressed their opinions on the subject, as it refers to this particular case.

But when such expert(?) authorities on building construction as the committee of five from the Bricklayers and Masons' International Union attempt to deceive the public as to the true cause of this disaster by publishing their conclusions as discussed from their *so-called* unprejudiced standpoint, and which appeared in the San Francisco papers of November 22d, a plain statement of facts should be brought forth, backed up by the best evidence. In the majority of reports on the subject there has been an evident desire on the part of the writers to shield someone from the responsibility of their criminal neglect, carelessness, or inexperience with the material they were using. This I shall not do, but will call a shovel a shovel, as I am more than convinced that this accident, with its terrible loss of life, would not have occurred had the men employed on this work any intelligent knowledge of the application of reinforcement in concrete construction.

This disaster, without its loss of life, instead of being an injury to the cause of reinforced concrete construction, should be regarded by our members as a valuable object lesson, which they may well study to prevent a similar disaster. Notwithstanding the recommendation of the committee of the Bricklayers and Masons' International Union, that the contractor is a practical and conscientious reinforced concrete contractor, the fact still remains from information obtained on that point, that his previous experience was confined to the building of concrete foundations for cheap cottages. His foreman, who had full charge of the work, is a carpenter, with a reputation for dare-devil recklessness not tending to promote the best results in reinforced concrete work. The concrete forms on the work were of a very flimsy character and of inferior material. They were made by carpenters (seven of those killed being of that trade), without the supervision of a competent concrete worker. The concrete was mixed by machine and placed by the most inferior labor to be found, the men were paid twenty-five cents per hour and worked from nine to foruteen hours a day, this same cheap labor being trusted with the placing of the reinforcement. They also placed all hollow tile in floors, curtain walls and partitions. Notwithstanding the solicitude of the Bricklayers and Masons' International Union for the reputation of hollow tile as a structural material of great strength and their interest in their fellow tradesmen, not one of their craft was em-



Showing Break in Column, Bixby Hotel



Showing Wreck of First Floor Girders Bixby Hotel.

ployed on the job, where so much *hollow tile* was used, nor was there one experienced cement worker ever employed on the work, which fact ought to be a source of great satisfaction to the members of this organization. The statement of the contractor, supported by the testimony of his foreman at the inquest, was that they were standing together on the roof at the time the collapse occurred, when the foreman exclaimed: "My God, something is breaking underneath," and which evidently had great weight with the Bricklayers and Masons' International Union committee in arriving at their unprejudiced, logical(?) conclusion, by which they attempt to prove that the failure was due to the basement columns crumbling or spalling under the imposed load, while the foreman sticks to his statement that the disaster was caused by the settling or sinking of a part of the foundation. With these theories in mind, I could not understand why a building 232 feet long by 176 feet wide, covering an area of over 26,000 feet, could collapse, and only a small portion, or about one-ninth of its area, be destroyed without some other reason.

I made a careful inspection of the foundation and basement columns, but found absolutely no evidence of the foundation having settled or been displaced in the slightest degree. Upon examining the basement columns, six of these having been destroyed, I found the parts of those still in place had broken off almost square, showing that they had been pushed or forced to one side by the great weight which had fallen upon them, instead of being crushed under the imposed load. In the basement some of the round tapering columns of the first floor, 19 feet long, 26 inches base, 22 inches at the top, showing their total original length, of which the Bricklayers and Masons' International Union have a photograph, revealing the upper end only with four ¼ square rods exposed by which they work to illustrate their idea of a reinforced concrete column *that was not reinforced*, as is clearly proven by a photograph of the same column which plainly shows that there was no continuity of reinforcement between the basement and upper floor columns or that it was attached in any way to the beam under it, simply resting on the first floor.

The Bricklayers and Masons' International Union have another splendid photograph of one of the basement columns which is still in its original position and supporting at least one-half of the load it was designed to carry. This column has a small fracture or crack in it directly opposite the point of impact, clearly showing the result of the collapse, but which in no way enlightens us as to the cause. There is another photograph which shows very conclusively that if this same column had been built of brick instead of concrete (and not even properly reinforced) that there would have been nothing left to photograph.

This ended my investigation of the theories expressed by the bricklayers, the contractor and his foreman. Finding the workmanship and materials employed in the construction of the foundation, basement and first floor above the average, I proceeded to the upper floors, and on the second floor found several columns for which the forms had been filled but one-half of their length when the work was stopped for a week or more for want of material (so I was informed by the superintendent). This fact is mentioned to show the reckless manner in which the work was continued from this floor to the roof. On the third floor was found a column ten inches square, which it was evident was not in the same condition as when the form was removed. I called the foreman's attention and asked how this occurred, and he told me that when the column was stripped a bad flaw was found, and he had patched it up. I inquired how he had accomplished this.

Showing Break in Column, Bixby Hotel

Showing Wreck of First Floor GirdersBix by Hotel.

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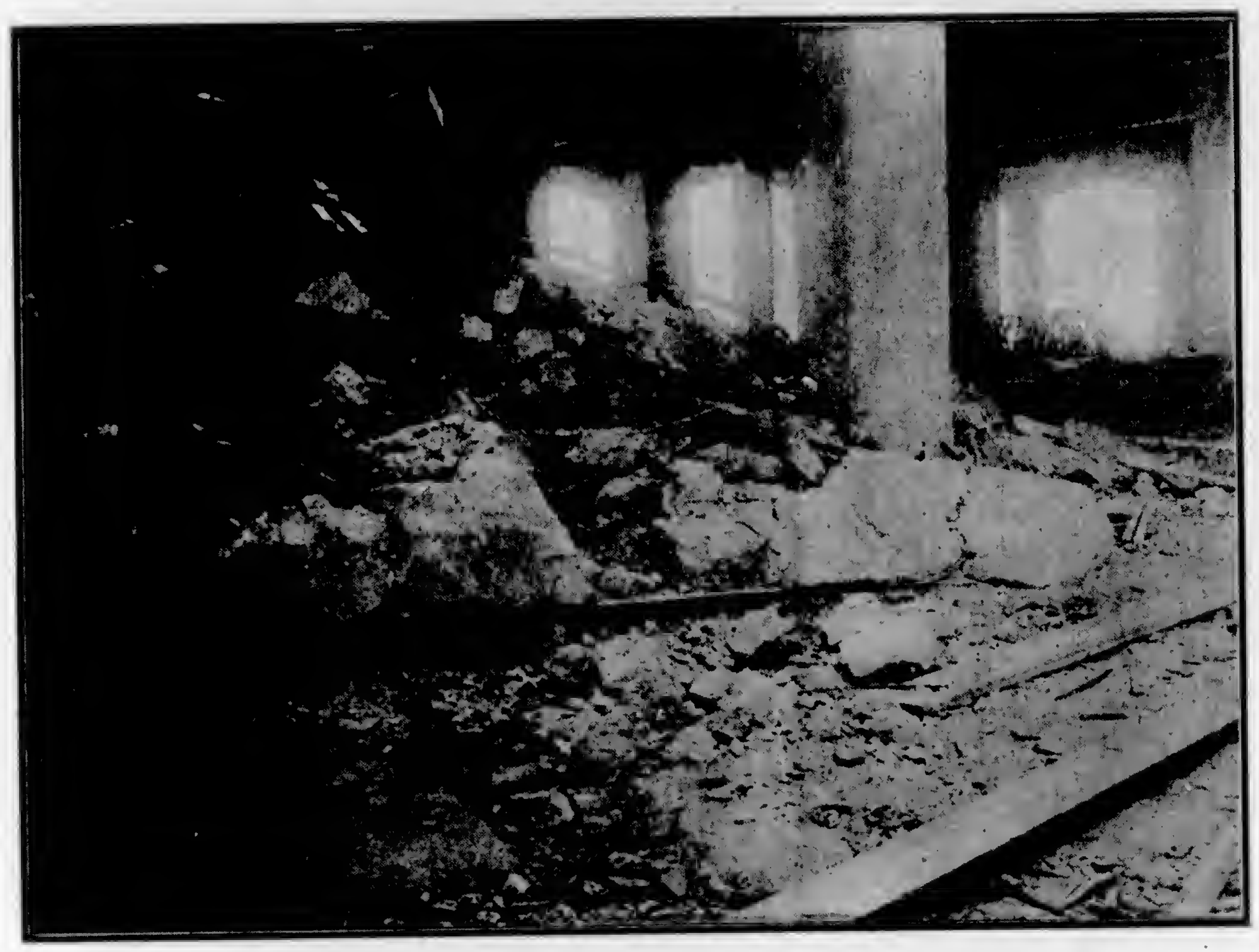

Showing Condition of Spandrel Beam after the Collapse, Bixby Hotel

He described how he had supported the beam on two pieces of three by six inches and lifted the weight off with jack screws. He then removed a part of the column and replaced the form, cutting away a portion of the beam in order to refill the column form. I naturally inquired *if this to me* remarkable feat had been performed in any other portion of the building and was informed that he had done it several times. To confirm this statement I interviewed several workmen who had been employed on the building, and there was abundant evidence of its truth.

I also received information of which the contractor or his foreman *make no mention,* that one column on the fourth floor, when stripped, was found to be so defective that it was necessary to remove it entirely. The beam above being shored up with two pieces of two by four, which had been wedged up as tight as possible to take off the strain. Before replacing this support of the fifth floor columns and roof beams, the work above was continued to the extent of placing about twenty-two cubic yards of wet concrete, weighing about 90,000 pounds, on the roof directly over the spot where these two by four props were supporting a roof area 38 feet 8 inches by 36 feet: equal in area to 1192 square feet, or more than one third of the total area destroyed.

It does not require any great knowledge or experience in the building trades to realize just what happened when Mr. Foreman exclaimed, "My God, something is breaking underneath." When this immense load of wet concrete on the roof was imposed on the two by four props on the fourth floor they buckled up and allowed the great weight to drop with terrible force, causing the outer walls to spread because of the omission of transverse beams or continuous reinforcement from wall to wall. The result can be plainly seen.

Believing this to be the information you desired, namely, the *real* cause of this lamentable disaster,

I respectfully submit this my report,
(Signed) T. E. KEOUGH.

Says Bixby Hotel Construction was not True Reinforced Concrete

By HENRY A. SCHULZE, Architect.*

COMPLYING with your request to visit the Hotel Bixby at Long Beach, California, in course of construction, and to report through you to the organization which you have the honor to represent, upon the collapse of a portion of the structure, which occurred between the hours of nine and ten o'clock of the morning of the ninth of November last, and to express an opinion, if possible, upon the causes responsible for the fatality, particular attention to be given in the investigation to the methods of construction, the quality of materials and the character of the workmanship employed, to this end I beg respectfully to report:

On November 17th and 18th last, accompanied by an assistant, I carefully inspected the collapsed portion of the building, made measurements and calculations of such parts as seemed necessary, incidentally giving attention to the undamaged portion to the extent that this might furnish additional evidence for the purposes of the investigation.

I looked at and studied the drawings for the building and interviewed the architect of the building, who gave me such information in the premises as I desired. The original drawings by the architect for the reinforced concrete construction (except the several floor columns) were not followed, but were superseded by an entirely different and patented system of reinforcement submitted by the patentee through the contractor and adopted by the owner, the special merit claimed in the substitution being that the patented system lessened the dead load of construction to about eighty-five (85) per cent of the system advocated by the original drawings. It would seem that this substitution was not made on the part of the owner for the purpose of saving, for the contractor was to be paid a considerable increase on his original contract price for the change; therefore the attraction to the owner must have been other than financial, though it would seem to have been ill-advised, in that the system adopted was devoid entirely (except at the roof, and that only partially, and first floor levels) of lateral stiffening girders at columns and of brace brackets or haunches between columns and beams at all levels, the absence of which no doubt added materially to the large extent of the damage and the fatalities to life and limb accompanying the destruction. In the original drawings each floor was tied transversely and longitudinally by beams from column to column and braced with haunches from columns to beams.

A careful inspection of the premises in the basement fails to reveal any settlement of the foundations or similar cause for the collapse. I would state that it was not possible for me to uncover the piers or pier footings under ground, but I am convinced the accident was not caused by any yielding at these points.

The concrete was of a very good character and no adverse criticism could be justly made against it.

The character of the workmanship was fairly good in the basement and first story, becoming inferior by degrees as the building grew upward, until there was a very marked degeneration of quality in the top story.

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* Mr. Schulze's report was made at the request of Messrs. Fisher and Keough, committee from the Cement Workers' Union of San Francisco, appointed to investigate and ascertain the causes which led to the collapse of the Bixby Hotel, Long Beach.

The construction as employed in this building can be hardly dignified by the name of reinforced concrete. It is only partly so, being more or less of a mixture to the disadvantage of the reinforced material, which is effective only to the degree it is intelligently employed, the part reinforced being but indifferently done. In the building under consideration the larger portion of the roof (except the portion which collapsed) was of wood construction covered with terra cotta roofing tiles; all floors, except the first, were constructed over large spans with light reinforced concrete joists spaced about eighteen (18) inches on centers, covered with a two (2) inch concrete floor slab, *not* reinforced, and filled in between the joists with hollow terra cotta building blocks, which from the very nature of things could not be or become an integral part of the construction.

The reinforcement of columns, where done at all or where in evidence, was done in a very indifferent and reprehensible manner, columns which are broken, even the largest of them (except in one case) show but four (4) half (½) inch round rods and these placed without axial continuity, not straight in their length nor with regard to distance from the outside surface of the column, one such support in the basement measuring twenty-one (21) inches square (and there were a number of them) showed the rods placed within the column from the surface at one (1) inch, three (3) inches, four (4) inches, and six (6) inches, when they should all have been the same distance at about one and one-half (1½) inches, and yet I was informed that the reinforcement was depended on to take its proportion of the load, this column was under and in the wrecked portion. Some columns which according to the schedule should have had eight (8) reinforcing rods, broke with a perfectly true level cleaveage at a joint in the work, revealing not a single rod in the column. During the progress of the work materials for the concrete ran out, and it was over a week that the work was entirely stopped. The column forms had been partly filled and when the work was resumed the juncture on the old work was made with a little neat cement and then proceeded with in the usual way. There are a number such. Portions of columns when stripped, in several instances, showed bad materials or bad workmanship. These sections were cut out and filled with new materials, one defective entire concrete column, at least, was removed bodily by shoring up the beams over it, and casting a new one in the place of the old. To one familiar with reinforced concrete the recklessness of these procedures must be evident. The winding of the reinforcement of the columns, according to the specifications was to be done with three-sixteenths (3-16) inch wire, spaced not more than sixteen (16) inches apart, wound all round the outside and crossed diagonally in both directions; in point of fact wire but one-quarter the size specified was used, spaced twenty-four (24) inches apart and crossed diagonally in one direction only.

The reinforcement of the beams, where in evidence in the wreck, was in the same indifferent manner. The drawing of a typical floor beam shows and calls for three bars in the reinforcement; with but few exceptions in the beams in the work, where broken, there have been but two such bars placed. The reinforcement was indifferently held in place with the same result as in the case of the columns, so that in the finished beam the reinforcement was in any place save in the right place. There are many places throughout the building where the beams have sagged materially, either the forms were too light, or the stripping was prematurely undertaken.

The lumber forms and supports for this work are of the most daring and reckless character. A very poor quality of lumber was used; many of the uprights are full of large and dangerous knots; they are of very light section, two by four being principally used, spaced five feet on centers; in numbers of instances they are not long enough to reach and are then very poorly spliced out; they are invariably wedged and shimmed up in the same wanton way; as the cost of the labor and lumber for forming in reinforced concrete work bears a very large proportion to the entire cost of the reinforced concrete, these forms were removed as soon as might be to be again used in other sections or floors of the building, this being in perfect accord with the skimping evident in the balance of this work.

The partitions where set in the several stories are formed of hollow terra cotta tiles; they are placed in the work with mortar in the horizontal joints only, none in the vertical joints. Many courses in the tiles are brought to a level by shimming with irregular pieces of tile; in some instances the tile have already crushed. This statement is made, not as bearing on the accident, but simply to emphasize the wanton recklessness manifested in the constructive work of the building up to the present.

It is impossible for me to say how the accident occurred with the evidence at my disposal in the time I was on the scene. For the purpose of this report I take it to be immaterial whether the collapse occurred through the skimping in the forms, their premature removal, the indifference or inefficiency of the reinforcement, the removal of sections of the columns, or the entire removal of a column when cast (the supports being indifferent during the operation of removal), insufficiently reinforced columns or other imperfection in the constructive design, any one of which was very possible with the sails trimmed as close to the wind as they were here in any condition of overloading or shock. However, I am convinced that the accident started in the upper floor, that one of these various adverse conditions caused the accident, the others being contributory, but reinforced concrete as such, intelligently applied, with due regard to constructive mechanics, will have no guilty part in similar calamities.

A Good Example of the Bungalow. Home of Dr. F. F. Roland, Pasadena

Interior Decoration

The Decoration of a Hotel

By C. WALTER TOZER.

THE decoration of hotels has become an art in itself and is a matter that is occupying the attention of the foremost decorators throughout the country. The hotel work that is being done nowadays is destined to lend an important educational influence. Never before in the history of decorative work has the subject of the decoration of hotels absorbed so much care and attention. This is no doubt due to the fact that the hotels now being erected are on very much more elaborate plans than formerly, and the increasing number compels each to strive for the newest and best treatments. The influence is very helpful to the decorative trade in general. The man who spends a few weeks traveling around and staying at the modern hotels comes home impressed with the coziness of their delightful sun parlors, sitting-rooms, libraries, and even the bedrooms charmingly done. It all helps, whether city man or village man; he returns to his home saturated with the delights of good decorative environment.

The decoration of the hotel must be a little theatrical, a little grandiose, and it must not so much appeal to all tastes as overlook and override them. This is especially true in America, but then we Americans are great travelers, and even the European hotels must furnish elegance as well as comfort to hold patronage of Americans.

New York is naturally the hotel city of America, and the number of elegant hotels of medium size is enormous, and constantly increasing. The immense and record-breaking establishments, such as the Waldorf-Astoria, St. Regis, New Astor, the Belmont and the new Knickerbocker cannot by any means hold all the patrons of hotels, and there are medium sized hotels that combine elegant furnishings and decorations.

The new Hotel Belmont is of especial interest from a decorative standpoint, because it is one of the most remarkable hotel structures in this country, and an excellent example of modern decorative art.

It cost $7,000,000; it is twenty-eight stories high, with five stories below the street level; has 1006 rooms, and is 200 by 105 feet, and 368 feet high 1200 employees are needed; two ship loads of coal are dumped into the bins adjoining the boilers at a time; the foundations of the first floor are sixty feet below the pavements; sixteen elevators, ten dumbwaiters, 1152 telephones, seventy tons of ice per day is the capacity of the ice plant; all the clocks in the hotel are tickless and operate from one central clock; 5000 linen sheets, 4000 pictures, 6600 lace curtains, 5000 mahogany doors—these are statistics that give ideas.

The furnishing has been carried out in the French period styles, beginning with the period of Francis I, to whose art enthusiasm the French Renaissance owes its stimulus.

We are impressed upon entering the lobby with the simplicity as well as the richness and the consistency of the undertaking. Enormous rugs cover the marble floors; the walls are resplendent in fluted pillars, with wainscotings and trims of Italian marble, with sculptured caryatides and atlandides, and heroic busts supporting the beams of the ceilings, the work of Mrs. Harry Payne Whitney (formerly Miss Gertrude Vanderbilt), who modeled them in her Newport studio.

The furniture is late Louis XIV in style and beautifully upholstered and elaborately carved in Italian walnut, showing the same comprehension and feeling of material and tool that was possessed by the carvers of that age.

The roof of the palm garden is a series of arches exquisitely decorated, the walls hung in hand-painted silks. The exquisite mural and ceiling decorations in dining and palm rooms are by M. Picard, the famous French decorative artist, whose work of a similar nature in Hotel de Ville, Paris, and elsewhere is greatly admired. The ladies' reception room is Louis XVI, light tones of ecru, fawn and gold, with rose hangings, pearl-gray and rose carpets and walnut furniture. Small restaurants extend along the corridors and windows of the main floor, quietly toned in pale greens with touches of rose and gold. The fabric work is beautiful, including Russian lace panels. On the floor of the main restaurant is one rug 100 feet long, and in this room the chandeliers are silver and crystal.

The restaurant on the cafe floor is beam-ceilinged and wainscoted in chestnut, with red tile flooring. Throughout the house the rooms are furnished in mahogany, except in the private suites, where walnut is much used. The scheme of decoration involves the employment of figured damasks where the walls are plain, and plain silk reps where the walls are figured. Armures are also used, as are French tapestries.

The mezzanine floor is homelike and restful—green rugs, comfortable lounging chairs, richly carved tables, Louis XIV, XV, and XVI, styles prevail above the lobby floor, and close attention has been given to the color effects. Purple, yellow, two-toned yellows, tones of brown are conspicuous examples, entire rooms being done in these harmonies of analogy; rich red carpets, red draperies and two-toned walls with white ceilings, or brown carpet with a lighter tone for the upholsterings, light tones for the wall-paper and ecru for the ceiling.

The more expensive suites, including the bridal and state suites, are on the parlor floor. They consist of salon, bedroom, private dining-room and maid's rooms, to which any number of rooms may be added at pleasure. These suites are decorated in Louis XVI style, and the doors are of rich red ma-

THE BEDROOM OF THE STATE SUITE, ST. REGIS HOTEL

This room contains the famous "ten-thousand-dollar bed," which, with all the other pieces of furniture, is of marvelously matched tulip wood. The furnishings, hand-made lace curtains and magnificent Louis XIV bedspread represent a sum of money equal to the income of an ordinarily prosperous man

hogany. The bathrooms are of royal magnificence in marble and cut glass, and all the doors close on air cushions to make them noiseless. The rooms are so arranged that a man may have a single room and bath out of a suite, or a visiting prince can have apartments a block long, with a private kitchen.

In every room at least one of the doors has a full length mirror.

Sixty dollar mattresses, seven hundred-dollar beds, four hundred-dollar dressers, three hundred-dollar dressing tables, a sideboard of Circassian walnut, $600; an extension table, $365—these vulgar prices are more eloquent of the character of these rooms than anything else we can say.

The hotel is full of surprises. Each floor is a hotel in itself, with kitchens and ovens independent of the hotel proper. The banquet-room has a gold ceiling and friezes; the walls are resplendent in dove-color marbles inlaid with gold.

From the slightly newer Hotel Belmont we turn to the Hotel St. Regis. Upon first entering the St. Regis, one is impressed by the sense of restfulness, and the place might seem almost plain as compared with some of the gorgeous hotels in the city. But in examining details, one finds every piece of metal, electrolier, elevator grille, counter railing, balustrade, or whatever it may be, a separate, individual work of art. Around the walls runs a light brown dado of shaded Istrian marble, surmounted by panels and carved pilasters of warm Caen stone. The window sills are verd-antique from the Alps. The corridor leading from the lobby to the restaurants is lined with veined gray marble. In the main dining-room and the ladies' dining-room adjoining, decorative sumptuousness reaches its climax. The walls are pictorial compositions of Rubia, Breche, Violette, and Pavanozzo marble, the veining in framed panels, giving the effect of delicate etchings. Carved ornamentation is heaped in almost barbaric profusion upon the domed ceiling and the arched doorways, its richness emphasized by a lavish display of dull gilding. The massive opulence of these apartments sets off the gay brightness of the neighboring palm room, where the creamy Caen stone above the Istrian marble dado on one side is reflected in a line of great mirrors on the other. Overhead Mr. and Mrs. Robert Van Vorst Sewell have illustrated the story of Cupid and Psyche in a series of dainty lunettes. In the connecting cafe, paneled throughout in quartered English oak, are hung three of a series of four notable sixteenth century Flemish tapestries, picturing incidents in the life of Solomon. A fourth is in the white ball-room above. The ball-room is truly dazzling. The walls are lined from floor to cornice with polished white Vermont statuary marble. The wall spaces are divided into panels, separated by pilasters of marble crowned with capitals of bronze. Yellow and white Venetian damask hangings relieve the hardness of the stone.

Main Dining Room, Belmont Hotel

The state suite is a most gorgeous conception. The Louis XVI salon, is treated with carved woodwork of an exquisite French gray, ivory-white in the high lights, and the walls paneled in cherry brocade. The lace curtains in this room cost $1500 a pair.

Of the two bedrooms in the suite one has been immortalized by the famous ten thousand-dollar bed—a creation of narrow strips of tulip wood, joined together with a cunning worthy of Japan, into a composition of delicately melting shades. All the furniture of the room is of the same wood, in Louis XV designs. Panels of a delicate electric blue brocaded tapestry share the walls with elaborately wrought woodwork of French gray and ivory white. The other bedroom, with similar wall decorations, except that the brocade on the walls is of old rose, is furnished in Circassian walnut of Louis XV models—a modest set, as befits its secondary importance, costing only a humble $8000. Between these two rooms is a bath-room about the size of an ordinary parlor, floored and paneled in marble, and containing a bath-tub cut from a solid block of the same material. All the bath fittings in this room are silver-plated.

There is less costly distinction in the regular suites for ordinary patrons, but not less luxury. Every suite has its bath-room, with porcelain bath and silver-plated plumbing, and its linen specially made in Belfast. Every private parlor is paneled in silk brocade, and carpeted with a rug, woven to its measure in a single piece of special design.

Another magnificent hotel of medium size that combines elegant furnishings and decorations, is the Gregorian.

The rotunda combines the effects of Venetian balconies, Corinthian pillars, Grecian stucco ceilings, marble and Italian friezes, and off this are a smoking room in purple, and the ladies' parlor.

The ladies' parlor is done in Louis XV style in tones of pink, buff and gold, and opens into a mahogany library. The draperies are silk moire, embroidered and damask fills the wall panels.

The dining-room is probably the best room in the house. It is a splendid adaptation of the Tudor style, with mezzanine balconies and wainscots of Flemish oak. The severity is removed by the use of stained glass windows, a stained skylight, and the use of heavy Roman ceiling decorations, and lustre chandeliers. All these, with the many white linen tablecloths, give anything but gloom.

A palm court, notable particularly for its very tall Grecian pillars and pilasters, which contrast their white against mahogany, is used for the lunch room.

The living rooms on the upper floors fall away strikingly from the elegance manifested on the ground floor—a very New Yorkesque trait—but what is lost in showiness is replaced by good taste and solid comfort. A real attempt has been made to keep the rooms harmoniously subservient to the rules of the styles, or at most, to avoid any seriously bad treatments. All the furniture and wall decorations are of good quality, and there is everywhere evidence of successful attempts to provide more than mere hotel effects. The taste is far better than the average displayed in American homes.

The Hotel Algonquin also affords examples of fine decoration. One of the most effective dining-room treatments is the Italian room of this hotel. It is located to the left of the main dinning-room and is decorated to represent a Neapolitan garden.

About two feet below the ceiling there is a series of lattices to which cling a quantity of wistaria, with blossoms in profusion hanging below. At the ends of the lattices may also be seen a quantity of oak leaves as from some overhanging tree. Above the lattices lights are arranged to give the effect of the stars and moon gleaming in the soft Italian sky. The entire east wall is taken up with a canvas by the famous painter, Frank D. L. Dodge, showing the city and bay of Naples by night, a series of hidden lights in addition to the moonlight effect from the ceiling giving the picture a most entrancing appearance. In the west and north walls, mirrors are set between plaster pillars, their lower edges resting on a wainscot of stucco, wherein at intervals are set a number of decorative panels in relief. At one end is placed a fountain, the waters continually playing under a soft green light, and at the South end doors open into the cafe. The furniture of the dining-room is of mahogany, rich, yet simple, and all the tables are covered with a piece of plate glass, a novelty that preserves the top of the table from dirt and scratches for an indefinite period.

The Dining Room, St. Regis Hotel

The floor is covered with a rich green carpet that harmonizes perfectly with the other details of the room.

The cafe is also worthy of attention. A large part of the wall is of stucco with handsome relief decorations at intervals. The buffet is of wood, finished in white, elaborately trimmed with brass scroll work on doors and columns. The floor is of concrete, in the center of which is imbedded a circular design in brass, several feet in diameter. The furniture is of weathered oak, heavily upholstered in dark red leather.

The walls are set off by a series of medallions, showing Indian heads, placed in the center of the otherwise blank panels and by numbers of heads and relief designs in plaster placed on the wainscot at short distances. The wistaria in the ceilings is one of the unique details of both rooms.

We will soon have three of our own magnificent hotels ready to be decorated the St. Francis, the Fairmont, and the Palace—and it is to be hoped their decorations will be distinctive and beautiful. There are a number of treatments that could be used in hotel work in San Francisco, that would make our hotels as unique as any of those of New York.

Among the Architects

State Board of Architecture

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Regular meetings, the second Friday in January, April, July and October.

New Palace Hotel

Trowbridge & Livingstone, of New York, the builders of the famous St. Regis of that city, are making good progress on the plans for the new Palace Hotel for San Francisco. In fact, the architects have a corps of draftsmen at work on the Coast now, and while the preliminary floor plans and street elevations have been completed, they have not yet been finally approved. Some changes have been made and others doubtless will be made as ideas of convenience or beauty may suggest.

The new building will be ten stories in height and will cover the entire block bounded by Market, New Montgomery, Jessie and Annie streets. Unlike the former hotel, there will be no bay windows, but the four exterior facades will be plain surfaced, ornamented with rich plinth courses and cornices in terra cotta that will make up a very attractive exterior. The main entrance, which will be in the center on Market street, will be a beautiful piece of architecture. There will be another spacious entrance on the New Montgomery-street side. At the ninth floor there will be a broad porch or balcony extending around all four sides of the building, which will serve as a promenade for guests, and from which views of the city can be obtained in all directions. The building will be of steel construction, supported with brackets of ornamental design. The interior courtyard will not be glass-covered at the roof, as before. The beautiful palm garden which for years was the admiration of all visitors will be a chief feature of the new hotel. It will be on the ground floor, as before, but will be a little more spacious in floor area. Its covering will be a great steel frame dome, rising from the level of the second floor at the sides and ends. This will be set with art glass, with jeweled panels and crystal pendants sparkling with incandescent lights. The interior walls of this courtyard will be of white glazed brick, and the lighting will be so arranged that the beauty of the art glass in the great dome will be as attractive at night as in the daytime. A feature of the palm garden will be a magnificent pipe organ.

The Phelan Building

Plans for the new Phelan building, which is to adorn the corner of Market and O'Farrell streets, have been approved. William Curlett is the architect.

The building will have a frontage of 328 feet on Market street and 296 feet on O'Farrell, covering an area of 28,000 square feet. The height will be ten stories, but the construction will be of such strength that additional stories can be built at some later time if desired.

Mahoney Brothers are the contractors. It was this same firm of builders that put up the old Phelan building twenty-five years ago.

The cost of the new structure will be approximately $2,000,000. It will be a class A building, containing every modern appliance for the convenience and safety of the tenants. Eight rapid-running elevators will be installed, and the appointments throughout will be equal to those in high-class office buildings of the most recent construction.

Competition for Hotel

In order to secure the handsomest design possible for the new hotel which the

bankers of Oakland intend to erect on Fourteenth and Harrison streets, it has been decided to inaugurate a competition in which all the great architects of the world will be asked to compete. As an incentive to spur the competitors on to work a cash prize of $25,000 is to be offered the successful architect.

Architect Walter J. Mathews, the designer of the Union Savings Bank building and the Athenian Club buildings, has been appointed supervising architect, and he will, with other local architects, act on a board of judges to decide the contest.

Death of Willis W. Polk

Willis W. Polk, father of Willis Polk, the well known architect, died very suddenly on Thursday afternoon at San Mateo, where he had been visiting relatives. Although past 68 years of age, he had been in fairly good health and his death was very sudden, being caused possibly by heart failure. He had partaken heartily of a Thanksgiving dinner surrounded by friends and members of his family but a few hours prior to his death.

The deceased was a native of Kentucky, but had been a resident of San Francisco for many years and was at one time engaged in the architectural profession in San Francisco. He is survived by three sons and a daughter, William C., Willis, Dan and Miss Daisy Polk.

Architects for School Buildings

The San Francisco Board of Supervisors has adopted a resolution appointing the following named architects to prepare plans for school buildings to be constructed under the bond issue:

McKinley School, A. Macrea; Bay View, Stone & Smith; new school on Grattan and Shrader streets, A. M. Edelman; Madison School, M. J. Lyon; Park School, A. F. Hiede; Sutro School, F. D. Voorhees; Golden Gate, Salfield & Kohlberg; new school, York and Twenty-third streets, Banks & Copeland; Winfield Scott, O. Haupt; new school, Lippard and Berkshire streets, Havens & Toepke; West End, A. M. Edelman; Oceanside and new school, Connecticut and Army streets, O'Brien & Werner; Polytechnic, D. D. Kearns; Sunnyside, Stone & Smith; Bergerot, Emil Lemme; South End, William Mooser; Sheridan, F. D. Voorhees; Marshall, M. J. Lyon; Spring Valley, William Curlett; Jean Parker, Stone & Smith; Garfield, D. D. Kearns; Panhandle School, Cole and Grove streets, Salfield & Kohlberg.

The plans of the schoolhouses are to be completed in thirty days.

Southern California Chapter, A. I. A.

At the annual meeting of the Southern California Chapter, A. I. A., the following officers were elected: President, Myron Hunt; vice-president, C. H. Brown; secretary, Fernand Parmentier; treasurer, August Wackerbath. These officers, together with A. F. Rosenheim, Octavius Morgan and J. Lee Burton, constitute the board of directors. The following standing committees were appointed: Membership, S. P. Hunt, A. B. Benton, T. Walsh; entertainment. F. D. Hudson, F. L. Roehrig; press, J. P. Krempel, A. F. Rosenheim and F. Parmentier.

Los Angeles Architectural Club

The Los Angeles Architectural Club has issued a neat pamphlet containing the names of its officers and committees; also a calendar of the various meetings to be held during 1906-1907, when subjects of interest to the profession will be discussed and papers read. On October 30th W. L. B. Jenney delivered a lecture on modern steel structures. On November 27th Arthur B. Benton discussed Spanish Renaissance. On January 8th, Theo. A. Eisen will take for his subject "Steel Construction." On February 12th "A History of Architecture" will be given by R. Mackay Fripp, and on March 12th Harrison Albright will read a paper on "Reinforced Concrete Construction."

N. W. Mohr, Architect

N. W. Mohr, architect at 1707 Geary street, is not associated with E. Mathewson at 622 Golden Gate avenue, as stated in the October Architect and Engineer. The name was unintentionally confused with that of Mr. Mohr's brother, O. H. Mohr. Mr. N. H. Mohr is a registered architect. E. Mathewson has returned to Fresno, where the popular architect has his hands full attending to his constantly growing business in that section.

Statue of "Grief"

Kuhne Beveridge (Mrs. Branson), an American sculptor, has completed at Brussels the cast of the statue of "Grief" ordered by the city of San Francisco to commemorate the victims of the earthquake. She will soon begin work on a second statue to represent the resurrection of the city of San Francisco—Exchange.

New Court House at Santa Rosa

The Board of Supervisors of Santa Rosa have adopted plans for the new Court House, for which bonds in the sum of $280,000 were carried by a heavy majority at the recent election. The plans adopted are by Architect J. W. Dolliver of San Francisco, and call for a building estimated at the exact amount of the bond issue.

It will have a frontage of 226 feet on Courthouse square, from Hinton to Exchange avenue, and a depth of 116 feet. The proposed plan calls for a steel constructed building, to be filled with reinforced concrete and faced with Colusa sandstone.

Five plans were submitted for the consideration of the Board. but only two were voted on before the selection was made.

Army Supply Post

Architects Rankin, Kellogg & Crane, of 1012 Walnut street, Philadelphia, Pa., are preparing plans and specifications for the $1,500,000 Army Supply Post at Fort Mason, San Francisco. The plans include a main office building, officers' quarters, power plant, and store-houses.

High School for San Jose

Stone & Smith, architects in the Midway building, San Francisco, have submitted plans for a High School building in San Jose to replace the structure demolished by the earthquake. While the plans have not been formally accepted it is thought probable that the Board of Education will eventually adopt them, as they seem to fill all the requirements. The plans call for a pressed brick and stone building of three stories with a modern heating and ventilating system and other features. The estimated cost is $200,000.

To Add More Stories

The Lichtensteins, who are building a large hotel on Market street at the junction of California, from plans by Architect Rousseau, have decided to add two more stories, making eight stories altogether. The original plans called for reinforced concrete walls and heavy wooden beams, but the new plans call for complete reinforced construction throughout.

New School at Napa

Plans have just been completed by Architect L. M. Turton of Napa for a new primary school building which will cost $40,000. The building will be a two-story structure containing eight rooms, six on the first floor and two on the second, and will be finished in old mission style.

Board Authorizes School

The San Francisco School Board has authorized the erection of the South End School at Bacon and Girard streets at a cost of $81,000 to be paid from the bond issue. William Mooser was appointed consulting architect at a salary of 3½ per cent of the total cost.

To Restore Mills Building

As previously stated in this magazine, Mr. D. O. Mills has decided to restore the Mills Building on Montgomery street without further delay. To this end he has sent here J. M. Robinson of New York who will take charge of the work. The building will be stripped of its brick and terra cotta and practically rebuilt. There will be no changes in the architectural lines of the building, nor will the height of the structure be increased. D. H. Burnham and John Galen Howard were the architects of the old building.

Bids Are Rejected

All the bids received for the erection of State Farm buildings in connection with the University of California, have been rejected. An appropriation of only $35,000 is available and the lowest bid received was for $39,000. The plans will be revised and new bids called for.

Pottery Works a Nuisance

Alleging that the fumes from the pottery works of N. Clark & Son in West Alameda ruin his plants, F. W. Vowinckel, an Alameda nurseryman, whose property is in the vicinity of the pottery works, has begun suit for injunction and $5000 damages. If he wins his case, and secures a permanent injunction, it will close a plant worth approximately $1,000,000, which has been running in Alameda for about a quarter of a century. The Clark plant has long been a source of much annoyance to the people of Alameda, and there will be general rejoicing if the courts decide that the works must go.

BUILDING REPORTS

Office Building—Sutter and Kearny streets, San Francisco.

Architects—Armitage & Rowell, 1427 Post street, San Francisco.

Owner—Davis Estate Company.

Cost—$150,000.

Plans are being prepared for a handsome eight-story class A building, having a steel frame, concrete curtain walls, with the front of the building faced with white enamel tile. There will be two elevators.

Two-story and basement warehouse—Second and Folsom streets, San Francisco.

Architects—Armitage & Rowell, 1427 Post street, San Francisco.

Owner—Davis Estate Company.

Cost—$125,000.

The building will have a floor space of 37,600 square feet and will have a sixteen-foot basement. Heavy wooden beams, floors and girders will be used and the exterior will be of brick and stone. The building is to be used as a wine warehouse.

Five-story building—Sutter, near Jones street, San Francisco.

Architect—Houghton Sawyer.

Owner F. M. Green.

Cost—$100,000.

This building will be a handsome class A structure, the steel work for which bids are now being taken. The building will have concrete walls and the front will be faced with caen stone.

Three-story and basement building—Northwest corner of Sacramento and Dupont streets, San Francisco.

Architect—A. A. Cantin, Monadnock Building.

Owner—Lowry Estate.

Cost—$40,000.

The building will be faced with red pressed brick and will have galvanized iron and sheet metal cornice and ornaments. An elevator will be installed.

Apartment house—Powell and Filbert streets, San Francisco.

Architect—William Knowles, Atlas building.

Owner—George Hind.

Cost—$25,000.

It will be a frame building, three stories high and will contain stores and fifteen apartments, with a bath for each apartment. A heating system—either gas, petroleum or steam will be installed.

Bank and office building—Salinas.

Architects—Schumacher & Binder, Theater building, San Jose.

Owner—Bank of Salinas.

Cost—$50,000.

The building will be 50 by 130 feet and will be fire proof, having a steel frame with reinforced concrete floors and walls. The front of the building which will be two stories high will be faced with pressed brick, stone and terra cotta. There will be three stores and banking room on the ground floor and 20 offices above. Mosaic floors and marble wainscoting will be features of the banking room. There will be two large vaults.

Telephone Building—Forty-fifth street and Telegraph avenue, Oakland.

Architect—C. W. Dickey, Oakland.

Owner—Pacific States Telephone and Telegraph Co.

Cost—$40,000.

This building will be a Class A structure and fire-proof. It will have brick walls with stucco exterior. The doors will be of metal and wired glass windows will be used.

Tourist Hotel—San Mateo.

Architect—Lewis H. Hobart, of New York City.

Owner—Corporation headed by Capt. John Barneson, president; Paul Pinckney, secretary, and Jas. H. Doolittle. manager.

Cost—$200,000.

The architect has been instructed to proceed with the plans at once. The new hotel will be called "The Peninsula," and will contain 150 rooms. It will be built on the same lines as the famous Del Monte Hotel at Monterey.

Flats—Devisadero and McAllister streets, San Francisco.

Architect—Julius Krafft.

Owner—William Wilson Company.

Cost—$40,000.

It will be a frame structure, three stories and will contain 10 apartments of five rooms each and three stores. For the same company the foundations have been started for a brick hotel of 100 rooms on East street, near Mission.

Wholesale building—North side of Sacramento street, near Battery.

Architects—Wright, Rushforth & Cahill.

Owners—N. A. Dorn and wife.

Cost—$50,000.

The building will be four stories, of brick and mill construction. The first floor will be of stone.

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Vol. VII. DECEMBER, 1906 No. 2

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NEW YEAR'S ANNOUNCEMENT

The Architect and Engineer takes pleasure in announcing the inauguration of two important departments beginning with the new year. In each case men proficient in their profession have been engaged to assume the editorship of the department selected for them. That our readers may become enlightened upon all matters of a legal nature, particularly state and municipal building laws, etc., Mr. T. C. Kieruff has consented to take charge of a legal department and any perplexing questions having to do with matters of law will be cheerfully answered by Mr. Kieruff through the medium of this magazine. Mr. Kieruff is a prominent member of the San Francisco bar and his extensive practice and wide experience makes him an invaluable addition to our editorial board.

It is with extreme pleasure that we announce the name of Mr. F. W. Fitzpatrick as a member of the Architect and Engineer staff of workers. Everybody knows Mr. Fitzpatrick than whom there is no higher authority on fire-proof construction. He is the organizer and executive officer of the International Society of State and Municipal Building Commissioners and Inspectors, and as a consulting architect he has been engaged upon most important and conspicuous public and private work from the Atlantic to the Pacific and from Maine to the Gulf of Mexico. He has been a practicing architect for twenty-three years and his indefatigable labors to improve building conditions, to standerdize building laws and to minimize fire risks in the cities are too well known to call for further eulogy here. By the arrangement made with Mr. Fitzpatrick architects or owners of buildings may have their plans and specifications, for all classes of construction, examined absolutely free of charge, he having agreed to write to such parties who avail themselves of this privilege a criticism of their plans and specifications with suggestions for the more perfect and perhaps less costly fireproofing of the work under contemplation if, in his judgement, such plans or specifications challenge criticism or require modification. This privilege is also available to all subscribers planning to alter and improve old buildings.

It is suggested that greater advantage may be derived from this consultation with Mr. Fitzpatrick if rough studies of plans and drafts of specifications are sent him first; his suggestions may then be incorporated in the finished plans, etc., without necessitating the trouble and expense of changing the latter.

It is also suggested that parties desiring this consultation write Mr. Fitzpatrick before sending sketches or plans; this will allow him to make a date when they had best be forwarded. It will be readily understood that busy as he always is, if plans are sent in without previous notice they will naturally have to be set aside until the more provident architects and owners who have made dates are served.

There is positively no charge attached to this service other than the postage or expressage on plans to and from Mr. Fitzpatrick's address, "Argyle" Piney Branch Road, Washington, D. C. It is an expense undertaken by The Architect and Engineer on behalf of its subscribers, and solely for the public good, but it must be understood that the publishers' contract with Mr. Fitzpatrick is exclusively for advice, etc., in regard to fire prevention—in the most liberal interpretation of the term, however—and if advice is desired in matters of design, ventilation, sanitation, etc., then arrangements must, of course, be made directly with him.

ARCHITECTS AND REINFORCED CONCRETE CONSTRUCTION

We again call attention to the absolute necessity for proper design and execution of reinforced concrete buildings. Architects not thoroughly familiar with this type of construction, make a serious mistake when they assume that outside advice is not necessary in the preparation of their plans and specifications. Unless an architect has made a thorough study of concrete construction he had better not trust too much to his own wisdom. Better far would it be for him if he placed his drawings in the hands of a competent engineer to work out, than to undertake the task himself and make a failure of it. The recent partial failure of a meagrely and imperfectly reinforced concrete and terra cotta form of construction in Southern California should be a warning that competent engineering assistance is an absolute necessity to safety. Had a competent engineer been called to assist in designing the Long Beach hostelry, it is assumed that the building would not have collapsed, for no thoroughly competent engineer, it seems to us, would have eliminated in his design the use of transverse girders, thereby placing the entire dependence for the horizontal transverse forces upon a thin slab construction. The partial collapse of the Bixby Hotel was not a failure, in any sense, of reinforced concrete construction, and only the opponent of reinforced concrete would dignify the columns of the hotel by classifying them as examples of that type of construction.

Puzzled

I know some terms of carpentry,
Yet this—what meaneth it?
They tell me he who takes a brace
Must no more touch a bit.—Ex.

The Publisher's Corner

From Foundation to Furnishings

The firm of Schasty & Vollmer, whose advertisement appears in this issue, having recently become permanently established in business in San Francisco, are prepared to undertake contracts for the construction of any class or character of building as well as to furnish, decorate and equip these to the point of readiness for occupancy.

The plan upon which they operate, and the broad scope their undertaking covers, has brought them exceptional success from the beginning of their enterprise.

Since their arrival in San Francisco, they have been appointed general contractors for the completion of the interior of the Fairmont Hotel; their contract covering full supervision of the interior, structural, decorative, equipment and furnishing part of this, the most important hotel project of the past decade.

Their appointment as Pacific Coast Agents for some of the largest producers of furnishings, decorative and equipment products enables them to offer direct service from the maker to consumer at wholesale prices.

Their close working relations with dealers and manufacturers of building and construction materials and their knowledge of the application of these to the end of harmonizing economy in construction and equipment with artistic and practicable result should encourage our readers to become better acquainted with their facilities and qualifications by sending for their booklet entitled "From Foundation to Furnishings."

Modern Office Building

Architect John C. Pelton has made plans for a large steel Class A building, six stories high with basement, to be erected at Second and Natoma streets, San Francisco. The building will be faced with Roman stone. The floors will be of reinforced concrete. The interior finish will be unusually elaborate. The cost will be more than $150,000. Barker, Knickerbocker & Bostwick are the owners. Wire plate-glass windows, mosaic tile floors, marble wainscoting and bronze stairways will make the building as near fireproof as it can be made. It will also have a compressed-air cleaning plant and steam heat.

Apartment House

The Enterprise Real Estate Company has bought the site of the old Abbottsford Hotel on Broadway, near Larkin street, and will erect thereon an apartment house to cost $100,000. No plans have been drawn yet.

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An Index to the Advertisements

New Advertisers Not Noted Here Will Be Classified Next Month

Page
Allen, Irving C.............113
American Construction Co.....109
American-Hawaiian Engineering Co.............109
American Sheet and Tin Plate Company.............116
American Steel and Wire Co...136
American Wire Fence Co...... 9
Archer, Charles F.......... 96
Badger Chemical Extinguishers............ 12
Baker & Hamilton 3
Barker & Walsh.............. 96
Barnes, W. F., Commercial Co. 121
Barneson Hibberd Co......... 13
Bass Hueter Paint Co...2nd Cover
Bay City Iron Works........ 118
Benicia Iron Works.......... 15
Bennetts Petroleum Burner Co. ....3rd Cover
Birk & Wegmann.............114
Blume, C. A. 15
Boesch Lamp Co.............102
Boyle-Luey Co............. 68
Boyle-Luey Co............. 91
Boyle-Luey Co.............115
Boyle-Luey Co.............123
Bowring & Co............... 13
Breite, W. W.............. 92
Breslauer, A. 99
Brittain & Co 14
Burnett, J. H., Iron Works .. 12
Burrell Construction Co. 3rd Cover
Cahill, James & Co.......... 88
California Art Glass Works.. 97
California Brick and Clay Co..121
Carnegie Brick and Pottery....132
Clinton Fireproofing Co. 8
Chubbuck & Harris...........131
Coles, Charles P. 13
Co-operative Artificial Stone Co. 129
Corwin, H. G...............114
Couchot, M. C.............. 92
Cotton Bros. 4
Decker Electrical Co.........103
Demolith Co................ 88
Dennison, A. D............. 93
Dietzgen, Eugene 93
Dunleavy & Gettle........... 88
Dunn Petroleum Burner......126
Empire Plaster 98
Enos Co. 101
Finn, John, Metal Works.....122
Flexo Roofing 98
Freeman, I. 15
Fuller, W. P. Co............113
Galassi, T. V., Masonic Co.....100
Gilley Schmid Co............111
Girvin & Eyre..............122
Gladding McBean Co......... 8
Globe Brass and Bell Foundary.131
Gregory Hardware Co.........131
Hardwood, Interior Co........126
Harron Rickard & McCone.... 8
Haskins, Arthur R. 12

Page
Healy Gale Co. 13
Henderson, Walter 128
Hendy, Joshua, Machine Works 103
Henshaw Bulkley & Co........108
Hercules Gas Engine Works...103
Hercules Manufacturing Co....113
Hewitt Machinery Co......... 93
Hipolito Screen and Sash Co...125
Holmes Lime Co. 7
Holt & Habenicht.............128
Hoyt Bros. 118
Ingerson & Glazer 129
Inlaid Floor Co..............126
Inland Architect 118
Interlocking Stone Co.........134
Johns Mansville Co........... 94
Jurgewitz, J. Fred............100
Kahn System of Reinforced Concrete ....104 and 105
Kehoe, William E.............123
Keuffel & Esser Co........... 89
Keystone Boiler Works.......102
Klein, F. 99
Klein, John C...............133
Klippert, J. E............... 88
Knickman & Nocenti 98
Leonard, John B......... ... 6
Lindgren-Hicks Co. 110
Levy Electrical Co............128
Lloyd, Gilbert & Robertson....120
Long & Hoyt 120
Los Angeles Pressed Brick Co........................ 15
Machinery and Electrical Co... 2
Maldonado & Co.......3rd Cover
Manetta, J. E................119
Mangrum & Otter............ 16
Marshall & Son 133
McGuigan, John 93
McMahon, Ross 117
McMurtric, T. A............. 5
McNab & Rothchild 114
McNear, Geo. W............. 99
Moller & Sons 128
Monash-Younker Co.......... 7
Montague, W. W., & Co...... 3
Moynihan & Co..............119
Nash, Carl Enos, Co......... 14
New Pedrara Oynx Co........117
North American Dredging Co.. 11
Occidental Machinery and Engineering Co. 135
Pacific Alamo Manufacturing Co. 127
Pacific Blower and Heating Co. 117
Pacific Coast Art Marble......119
Pacific Coast Paper Co....... 5
Pacific Concrete Machinery Co.. 16
Pacific Construction Co.......125
Pacific Fire Extinguisher Co... 2
Pacific Mantel and Tile Co.... 92
Pacific Manufacturing Co......134
Pacific Paint and Varnish Co...130
Pacific Plymouth Plaster Co.... 95
Pacific Portland Cement Co. 1st Cover

Page
Pacific Rolling Mills...........132
Pacific Surety Co. 118
Palace Hardware Co..........131
Paraffine Paint Co............114
Parcells Safe Co.............128
Peerless Agencies Co..........122
Pettus, T. A........ 101
Ralston Iron Works.......... 12
Redwood Manufacturers Co....100
Reed & Co...................136
Reilly, J. F. & Co............122
Richards-Neustadt Construction Co. 133
Richter Mfg. Co.............119
Roberts Bros. Co.............136
Roberts Combination Water Heater 117
Roebling Construction Co...... 16
Roebling, John A., Sons Co....126
Rulofson, A. C............. 16
Russell & Erwin Manufacturing Co..................... 98
San Francisco Cornice Co.....107
Sanitary Devices Mfg. Co.....124
Sarsi, O. S.................. 95
Sass & Son 128
Schastey & Vollmer 91
Schwindelauf, C. W. & Co.....130
Scofield Co. 107
Skinner, Theodore H.......... 96
Smith Rice Co...............129
Solar Heater Co........2nd Cover
Standard Brass Casting Co....115
Standard Electrical Construction Co. 108
Stanquist, Victor & Co.........107
Steiger Electrical Co..........128
Steiger Terra Cotta and Pottery Works 102
Strong, Belden & Farr........118
Sunset Lumber Co............ 88
Tamm & Nolan 130
Thompson-Starrett Co. 10
Tibbetts Roofing Co........... 96
Tozer, L., & Son Co.......... 14
Tucker, W. W...............132
Union Blind & Ladder Co.....111
Union Lime Co.............. 88
Van Emon Elevator Co....... 1
Watson, W. J., Roofing Co.... 1
Wellington, George J.........114
Westcott, C. A., Paint Co.....118
Western Building Material Co. 4th Cover
Western Builders Supply Co...111
Western Expanded Metal Co...118
Western Inspection Bureau....112
Western Iron Works......... 97
Western Roofing Materials Co.. 96
White Bros 104
White-Frauneder Iron Works.. 97
Whittier Coburn Co........... 14
Wieland, C. F...............118
Worswick Street Paving Co....115
Woods & Huddart 109
Yates & Co.................. 94
....

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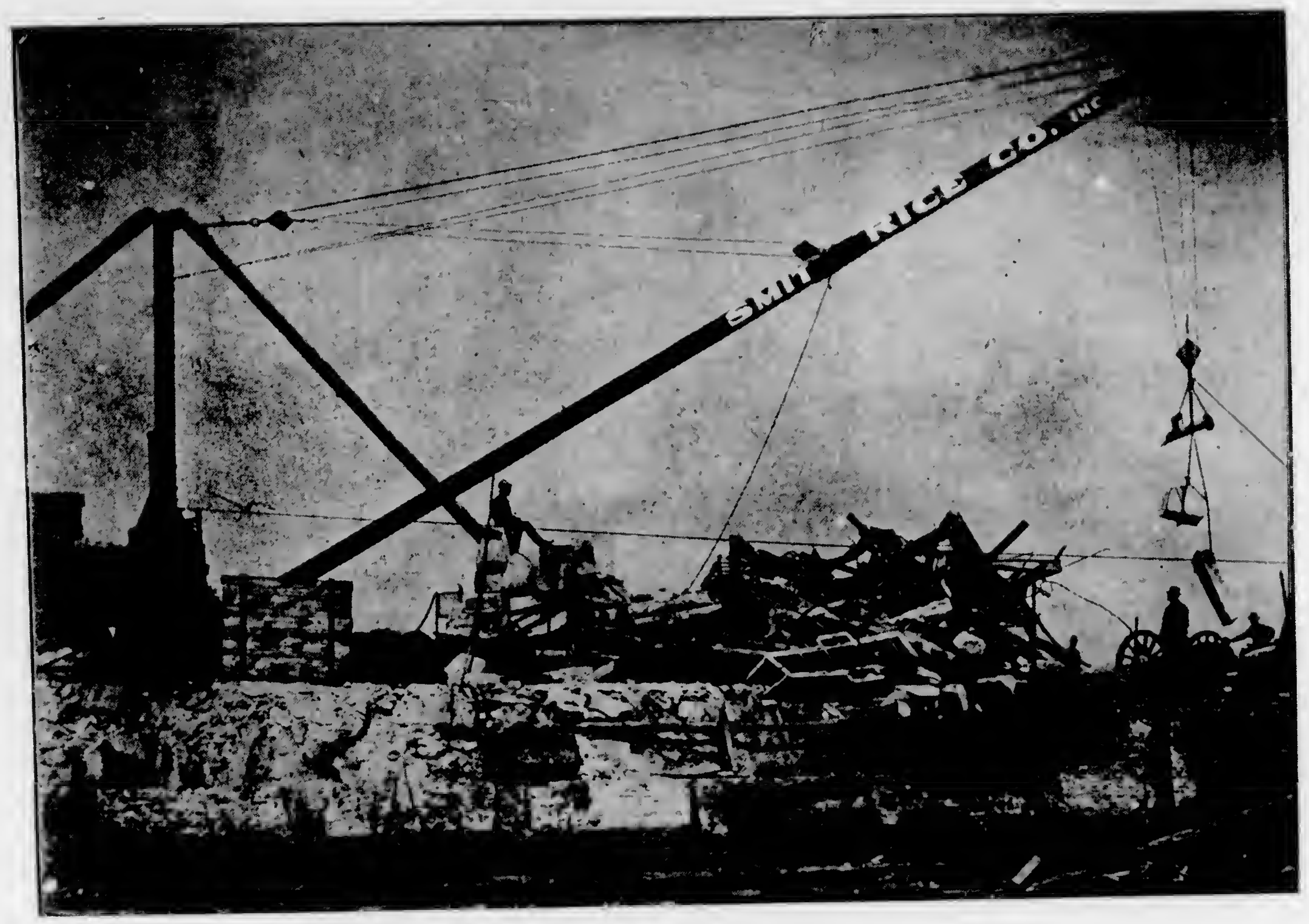

How the Debris is Being Cleared in San Francisco

The above picture gives a very fair idea of how the debris is being removed from the San Francisco ruins. The Smith-Rice Company are among the foremost contractors to participate in the wrecking and clearing work that has been going on since April. The company has excellent facilities for this class of work and wherever there are spur tracks at hand quick progress is made in getting a lot that is strewn with twisted steel, broken stone and powdered brick, clear of obstruction and ready for building. In addition to wrecking walls and removing debris the company is prepared to erect buildings of all classes.

Two Class A Buildings

Florence Blythe Moore will build a Class A six-story store and office structure at the southeast corner of Market and Second streets, at an outlay of $300,000. The materials will be steel, concrete and brick. Mahoney Brothers are the builders, and Bliss & Faville the architects. The Italian Bank is to erect a four-story Class A building at Montgomery and Sacramento streets, to cost $120,000. Mahoney Brothers will build it, and Howard & Galloway are the architects.

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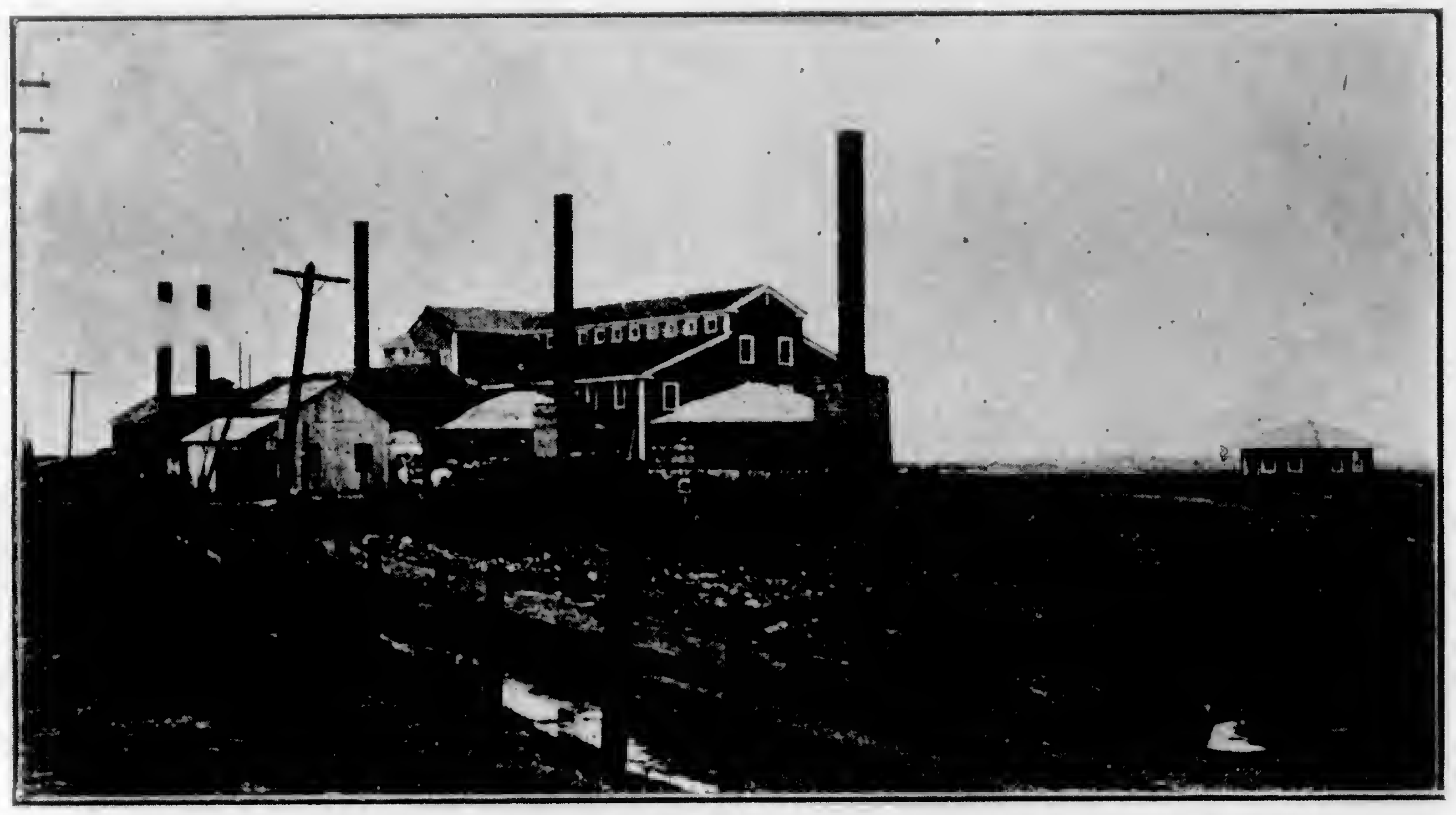
Big Brick Plant in Operation



California Brick and Clay Company's New Plant at Antioch.

So brisk has been the demand for material that the California Brick and Clay Manufacturing Company has found it necessary to proceed with substantial additions to its new plant at Antioch. A building 300 feet long by 75 feet wide is under way, and work on additional kilns is to be started at once.

The plant is in full operation and in addition to sewer pipe, flue linings and patent chimney pipe, the company is turning out an excellent grade of hollow brick for fire proofing, etc. Permanent offices have been established in the Monadnock building and Mr. John G. Treanor, than whom there is no more experienced man on the Coast, is the general manager.

The company is in a position to handle immediate orders promptly, and it has excellent facilities for shipping in carload lots or in smaller quantities, via. the Southern Pacific, Santa Fe or by boat. W. F. Barnes is president of the company.

Another View of the California Brick and Clay Company's Big Plant at Antioch.

American System of Concrete Reinforcing

The Pacific Concrete Machinery Company, dealers in concrete reinforcements and cement workers' specialties, have taken the contract for supplying the American system of reinforcing for the Western Meat Company's big building at Sixth and Townsend streets, San Francisco. The building is to be of reinforced concrete, two stories, and will cover about 50,000 square feet. The American system consists of wire fabric and bars of high carbon steel, and is considered one of the best as well as the most economical reinforcing on the market.

The Pacific Concrete Company has also taken the contract for equipping the upper five floors and roof of the Latham building with the American system. The offices of the Pacific Company are in the Atlas Building, 604 Mission street.

Hoyt Bros. Branch Out

Hoyt Brothers, the well-known Santa Rosa contractors, have taken several good jobs in San Francisco and are prepared to figure on other work at short notice. The firm will be pleased to receive plans from architects desiring bids on their work anywhere in the State. After the first of the year Hoyt Bros. will have an office in San Francisco, due notice of which we will give you later.

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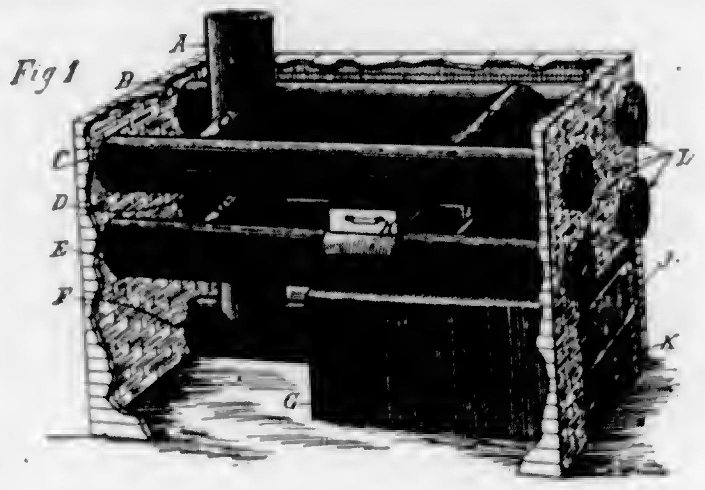

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M. C. Couchot, C. E., is supplying Kahn system reinforcement for the following new reinforced concrete buildings, which are going up in San Francisco: Three-story warehouse, covering lot 137½ feet square, on the east side of Sansome street, at the corner of Vallejo, for the Bemis Bros. Bag Co., cost $75,000; six-story and basement stores and lofts, 40 by 160 feet on Mission street, near Fourth, for Emilie K. Latham; architect, Edward Bowles; contractors, Cook & Young; three-story wholesale store at 311 East street, with provision for two more floors later, for Wellman, Peck & Co., 160x137½ feet; cost $60,000; Julius Kraft, architect; thickness of wall, 8 inches; Keatinge & Sons, contractors; six-story building at Sansome and Clay streets, architects, Chas. Paff Company; contractors, Co-operative Stone Company; First National Bank Building, Oakland, L. B. Dutton, architect; Thompson-Starrett Co., contractors.

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We congratulate the tin roofers of the United States; we congratulate the architects and the public; we unequivocally record our approval and hearty commendation of the courageous stand now occupied by the manufacturers of terne plates upon the insistence that the tin plate business shall stand upon the rock foundation of "the square deal." The Metal Worker takes pride in reciting that this industry which, since the enactment of the McKinley bill, has come to be regarded as a monument to the skill, energy and sagacity of American ingenuity, is among the first, without coercion, to catch up the war cry of the twentieth century and in its refrain announce to the world that the proper conduct of business demands a high moral standard.

The sale of roofing plate is to be revolutionized. For decades, for a century or more, this article of commerce has been sold by private marks, by twisted, thread-worn meaningless appellations, such as "Old Style," "Old Method," "Redipped." In early days, no doubt, these terms meant something, but in the scramble for business through these long years they have become hopelessly confused, and the buyer of roof-

(Continued on page 129.)

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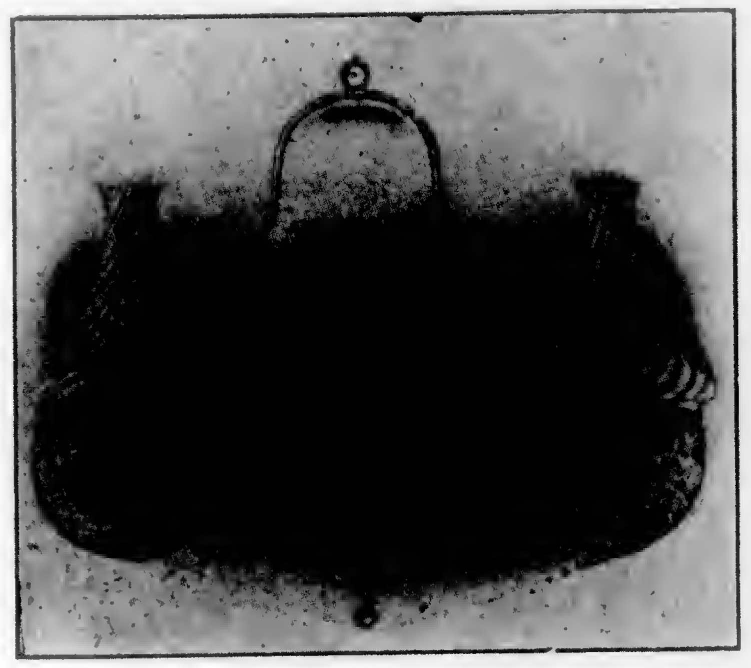

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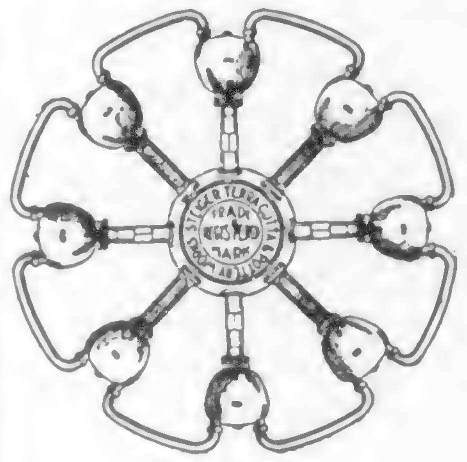

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(Continued from page 101).

ing plate has found himself groping about with a bewildered and faltering step among the honest or dishonest assertions of this salesman or of that. All this is to be changed—the architect, the roofer or the house owner, provided only he can read—is to be able to secure precisely what he pays for, and is to be able himself, without any technical knowledge, to determine this point absolutely.

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square deal. That the company which has taken the initiative in this innovation runs some risk of a loss of business during the period when architects, builders and roofers are being made familiar with such a frank statement of quality must appear evident to all who give more than superficial attention to the far-reaching action. The move strikes at the very heart of the industry. It concedes to the tin roofer more than he has asked; it crushes the malpractice of years in one fell stroke, and with firm grasp uplifts the business to a plane of dignity and honor. As such in enforces co-operation, it demands the support of all manufacturers, of all roofers, of all architects, of all builders.

Eliminating single interests, a broad view of this bold advance more fully explained in another column leaves no doubt that the integrity and plane of the whole roofing industry will be raised by simple co-operation.

Order Your Cement Now

A. Breslauer, the well-known cement merchant and broker, expects a large consignment of Portland cement, "Gillingham" brand, about the middle of this month. It is coming on the steamship "Suverie" and will be sold at a special price in quantities to suit the buyer if ordered at once. Mr. Breslauer may be reached at his office, 214 California street, or if you haven't time to call, ring him up. The phone number is Temporary 2350.

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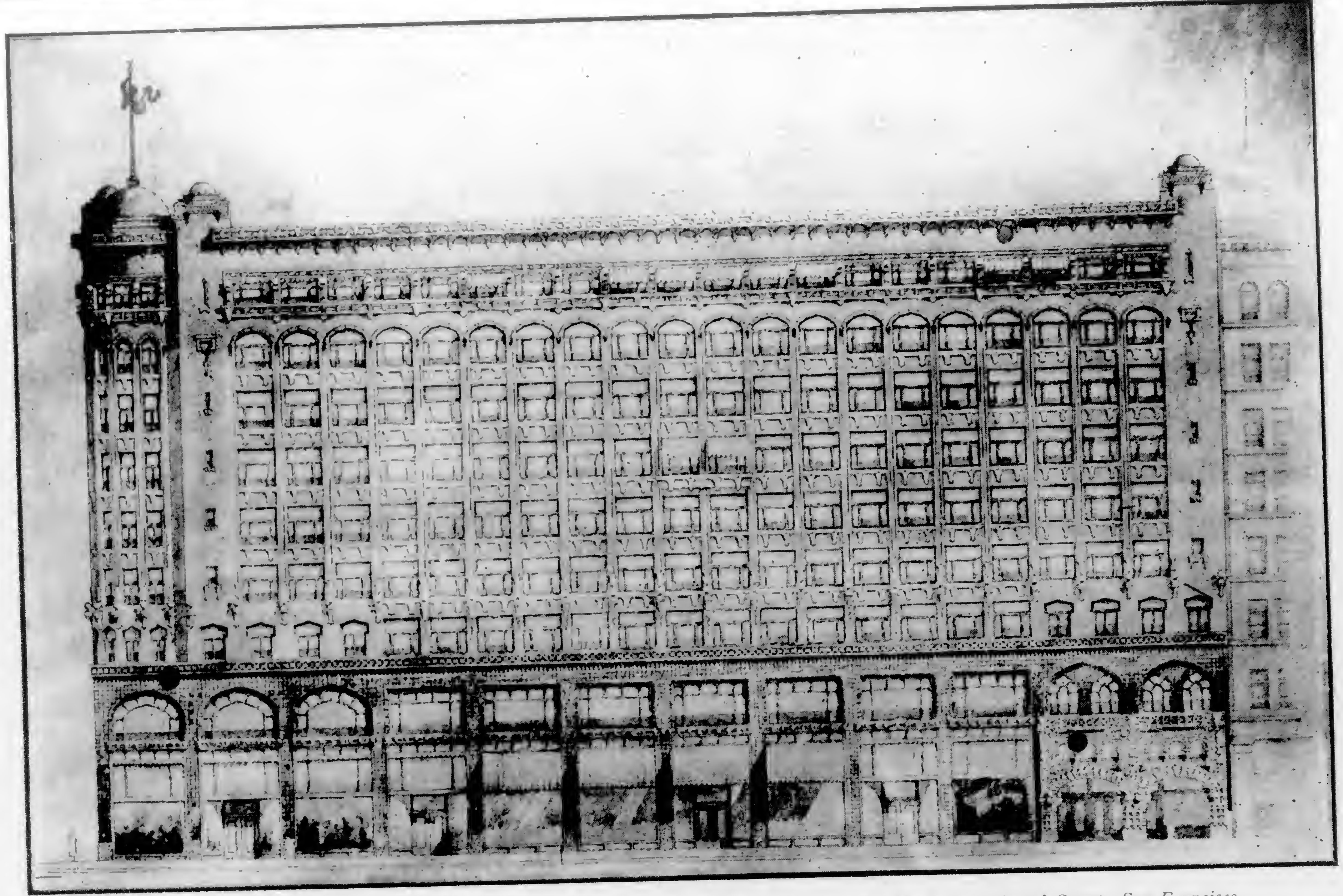
Contents for January

PAGE

Frontispiece—The New Flood Building - - - - - - - - - 18
World's Largest Reinforced Concrete Office Building— *Charles F. Whittlesey, Architect* 19
Earthquakes and Earth Faults - - - - *William Ham. Hall, C. E.* 20
Want More Class A Buildings - - - - - - - - - - - 25
The Recrudescence - - - - *Robert Morgeneier, Architect M. E.* 27
Wind Anchors for a Skyscraper - - - - - - - - - - 29
The Sonoma County Court House - - - - - - - - - - 31
Fears Repetition in San Francisco of Bixby Hotel Disaster *A. W. Rush, C. E.* 35
Reinforced Concrete Construction in Southern California— *Harrison Albright, Architect* 37
Cement and Concrete—A Surface Finish for Concrete, *Henry H. Quimby, M. Am. Soc. C. E.* 44
The Architect's Relation to Concrete Construction, *Jens C. Peterson, Architect* 51
Comparison of Cost of Concrete Stone Masonry - - - - - 52
Buildings Cast of Concrete - - - - - - - - - - - 53
Concrete Will Not Supersede Steel - - - - - - - - - - 53
Fire Protection—The Red Monster - - - - *F. W. Fitzpatrick* 55
Terra Cotta and Brick—A Brick (a verse) - - - *Frank Honeywell* 57
Advantage of Brick Buildings Over Others - - - - - - - - 59
Statistics of Clay Working Industries - - - - - - - - - 60
About Sand Lime Brick - - - - - - - - - - - - 61
Paint, Oil, Varnish—The Ready Mixed Paint Question - *H. T. James* 60
About Filling, Varnishing and Finishing Interior Wood-Work. - *H. T. James* 63
Interior Decoration—The Decorative Periods - - *C. Walter Tozer* 67
The New Wall Papers and How They Are Selected - *C. Walter Tozer* 70
DEPARTMENTS—Among the Architects—Editorial—Publisher's Corner.



Front Elevation of Nine-Story Office Building to Occupy the Site of the Old Flood Building, Market and Fourth Streets, San Francisco
Charles F. Whittlesey, Architect

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